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Network

TECHNICAL REPORT NO. 184

Mark I Scaler System

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2002 July 10

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Abstract

Drawings of the Mark I scaler system in Izaña are presented.

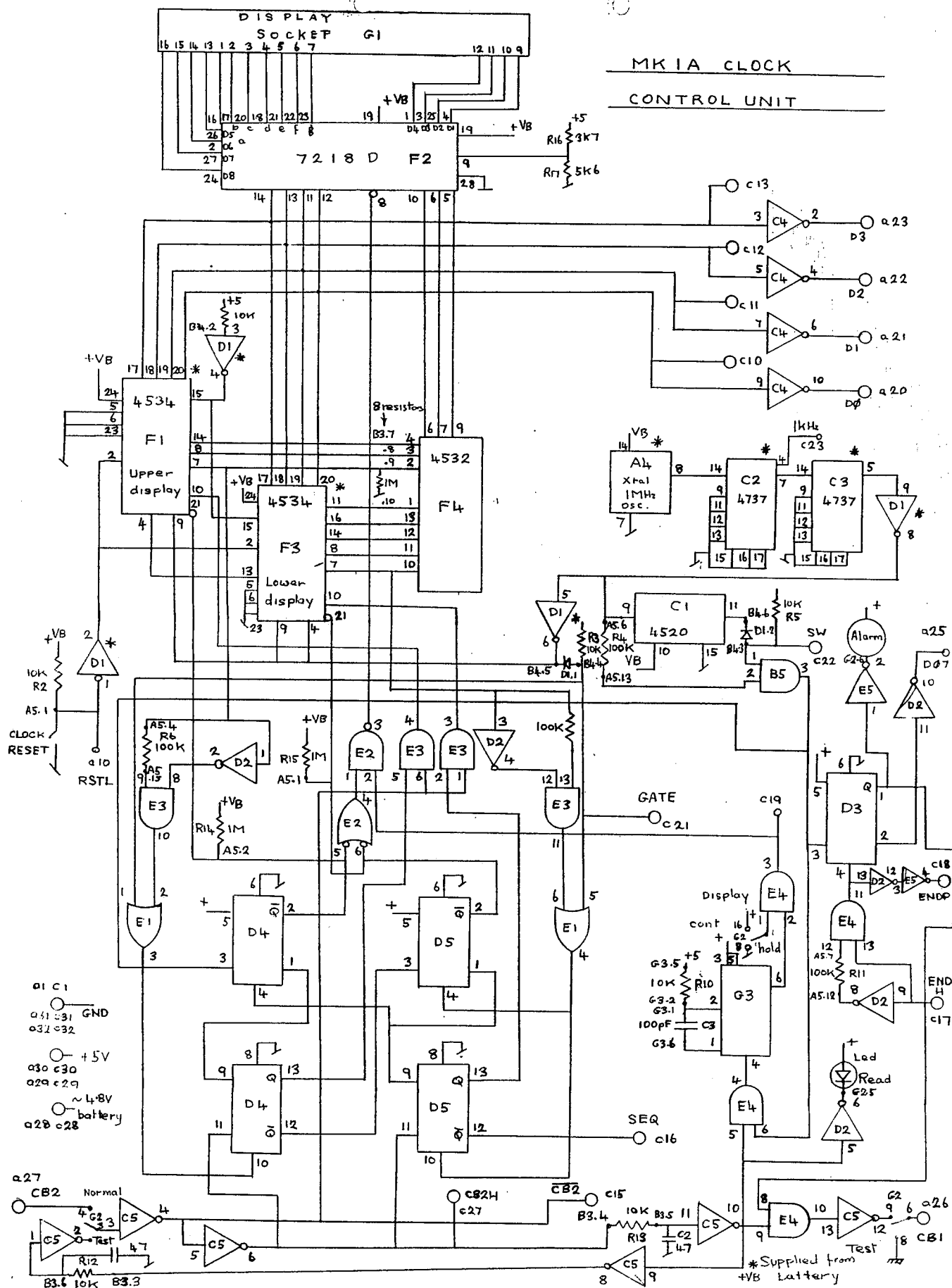
Way back in 1970, the first HiROS resonance-scattering spectrometer was built [1]. It eventually found a home in Izaña, Tenerife and was called “Mark I”. The system was computerized in 1984 and has been running on a BBC ever since. A failure in the GPS, and later a mistake that wiped out the Archimedes computer that was translating the data, led us to consider replacing the computer system with a more-modern PC-based system. In order to do this, it was necessary to find the documentation for the Mark I scaler system.

There once was a green folder labelled “Mk I Scalers” which contained the relevant drawings. It was hidden away in Poynting T2, the little room at the back of T1. Eventually, the green folder was located. And it was found to contain many, many drawings. And many of these drawings were copies of each other with various marks and notes carefully written on them.

This report contains the most important of these drawings. They have been rendered in the clearest, most readable, form that is possible from a photocopier. This report does not describe how the scaler system works. For that, you should read the scaler manual [2].

References

- [1] BREK A. MILLER. BiSON resonance-scattering spectrometers. *BISON Technical Report Series*, Number 67, High-Resolution Optical-Spectroscopy Group, Birmingham, United Kingdom, February 1998.
- [2] CLIVE P. MCLEOD. BiSON scaler/control crate notes — Mount Wilson installation 1996. *BISON Technical Report Series*, Number 173, High-Resolution Optical-Spectroscopy Group, Birmingham, United Kingdom, June 2001.

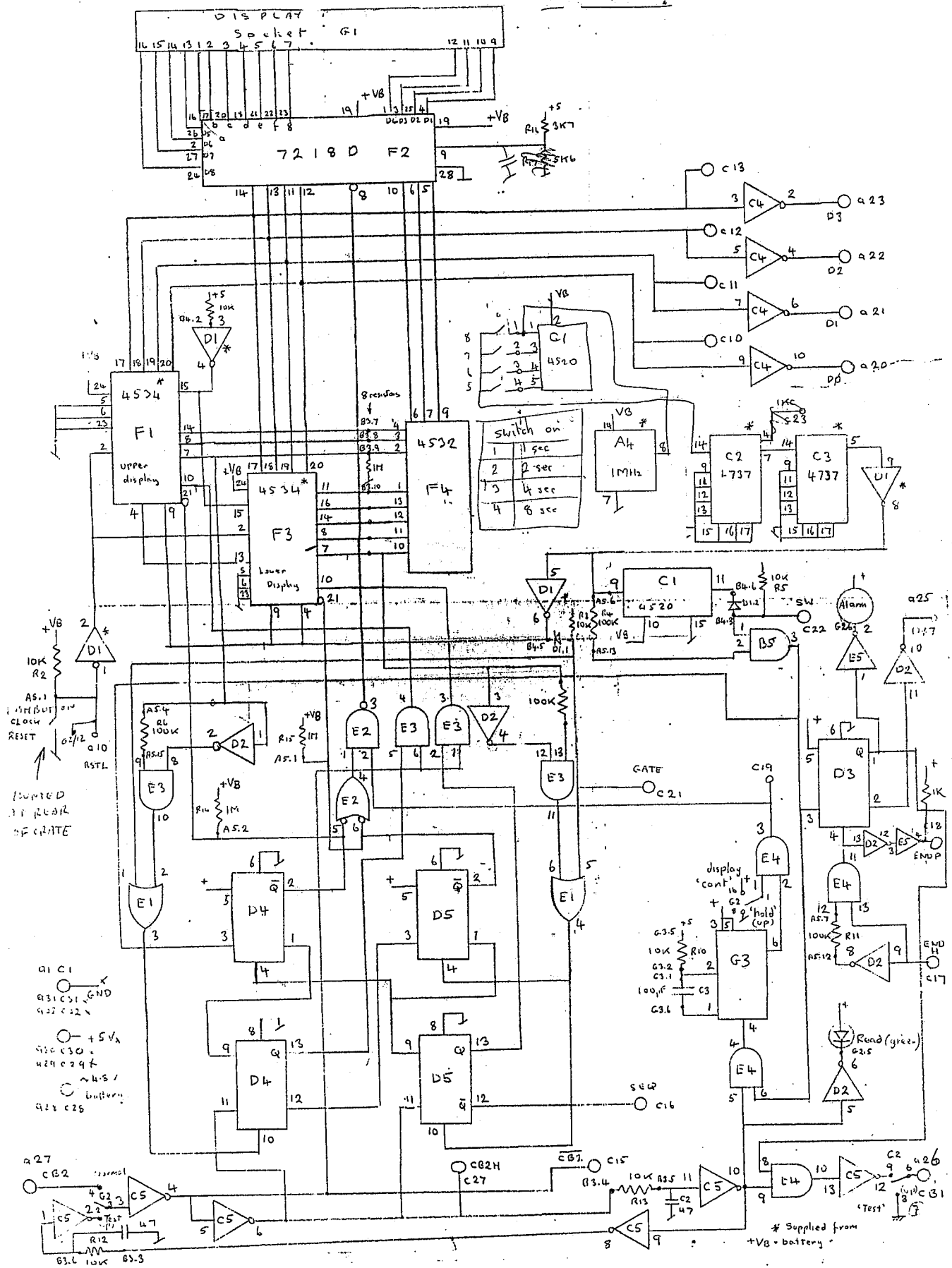


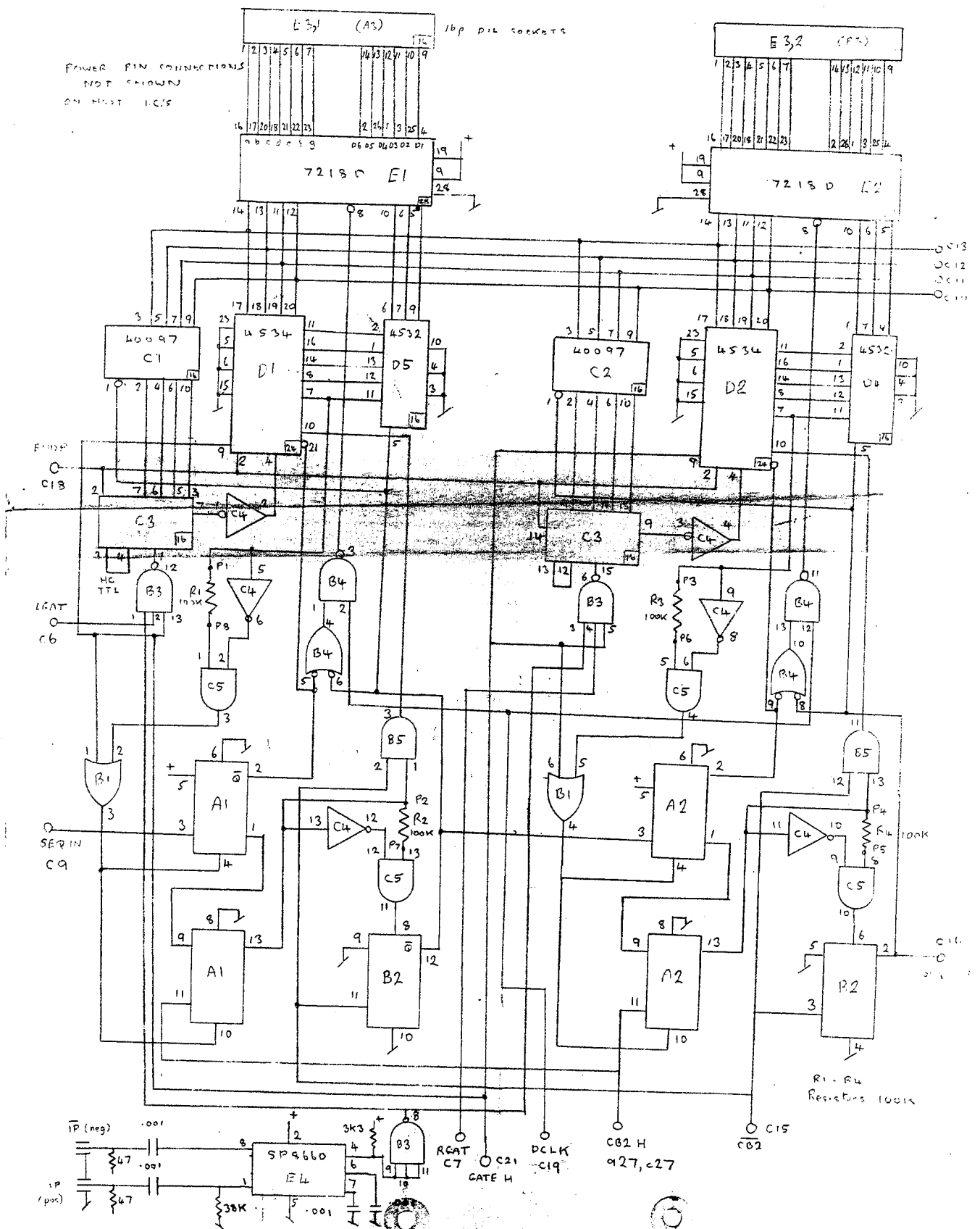
MIN 1A

CLOCK

2

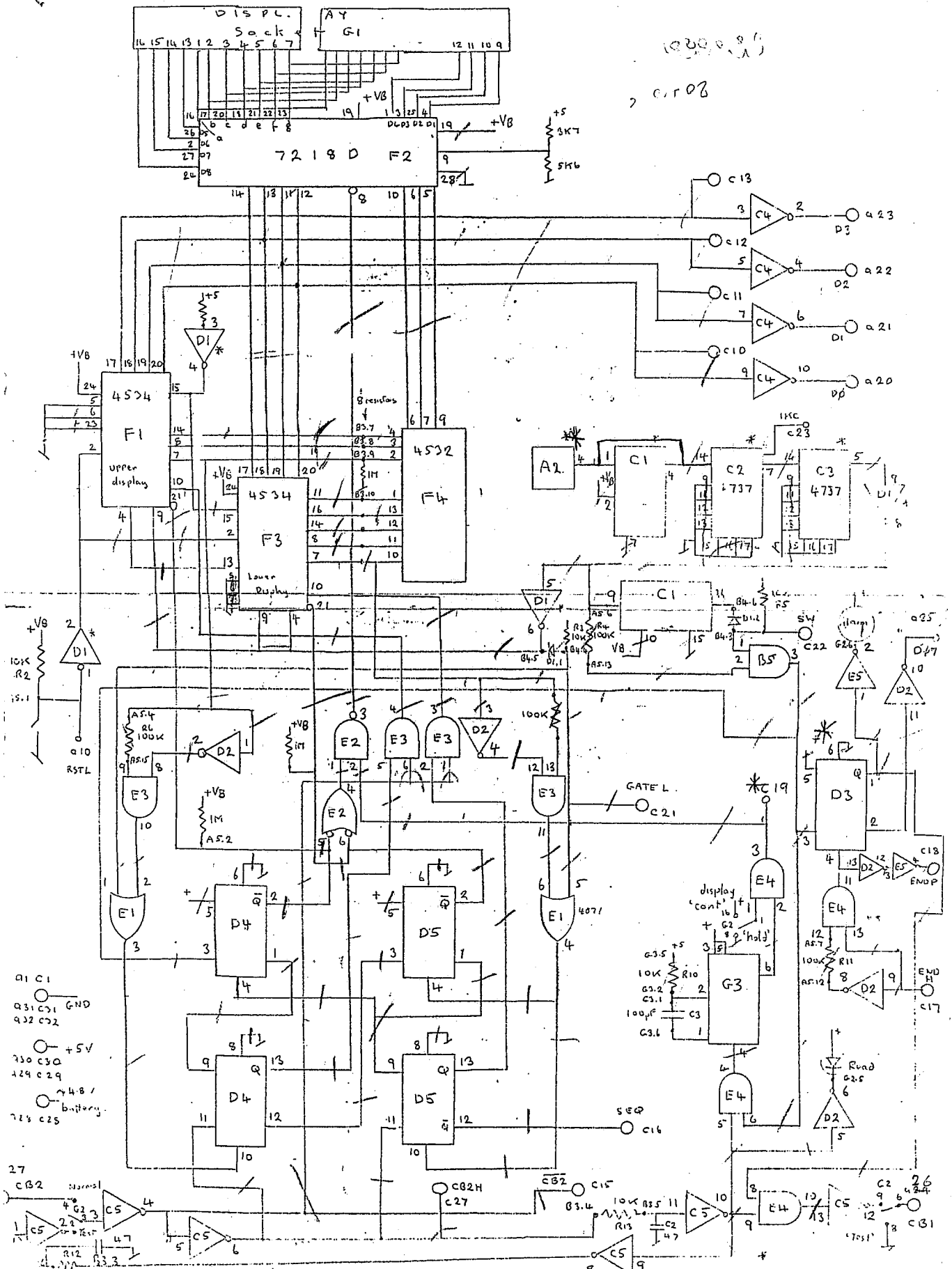
LUNAR



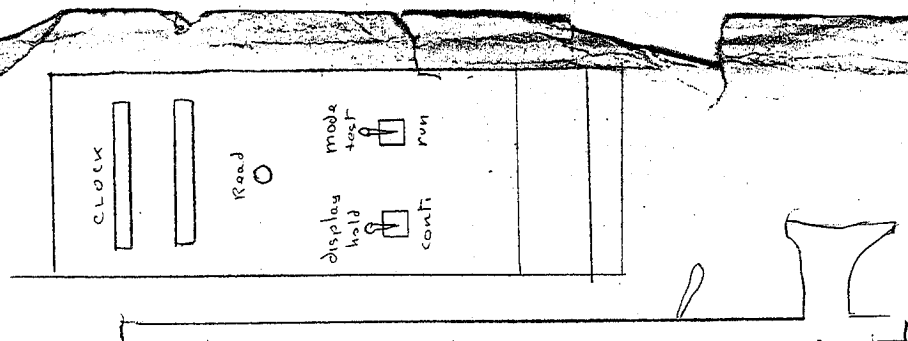


MINI A CLOCK & CONTROL

C.P. McLeod Jan 1984



C. Michael Tan 1984



EUROFRAME
3U x 10E

pin side

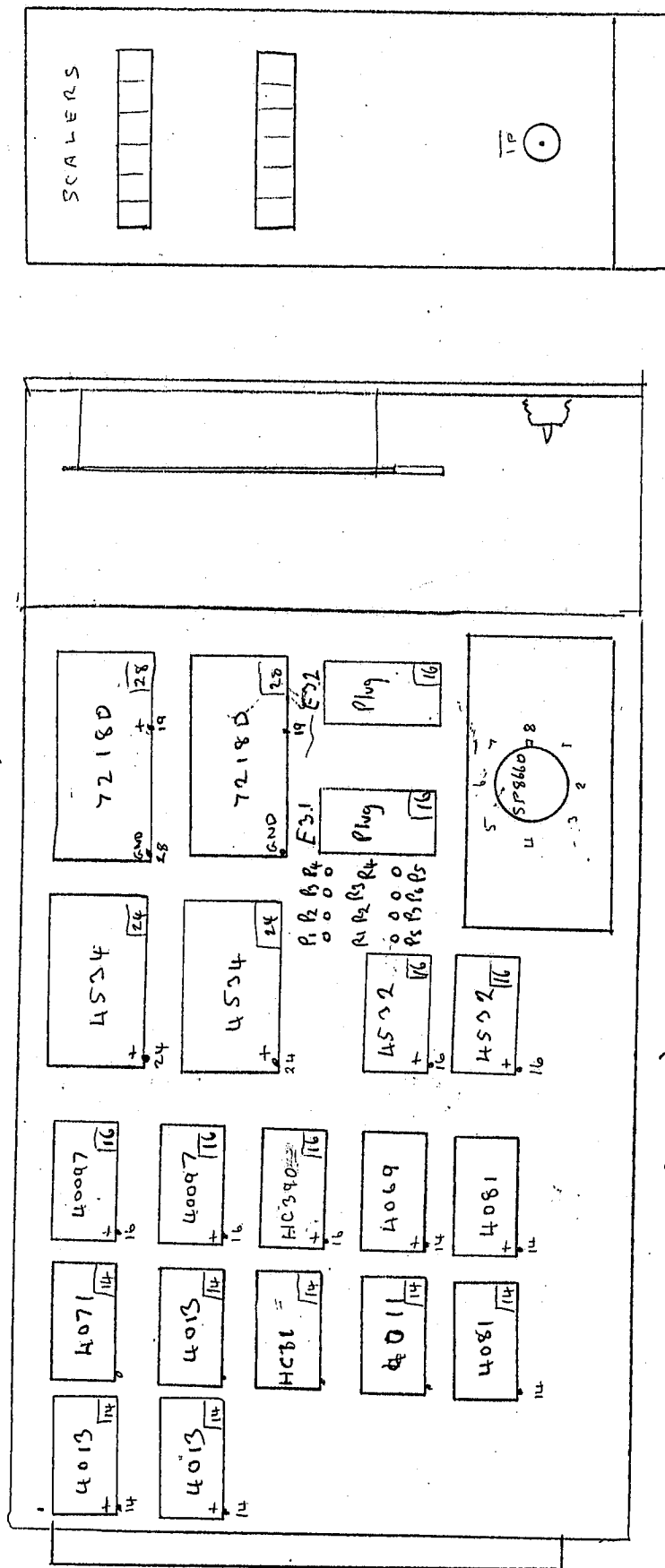
82 87. 88. 89. 90. 91. 92. 93. 94. 95.

gnd and Vcc pin numbers shown where unusual

MMIA SCALER BOARD LAYOUT

created Jan 1984

A B C D E



pin side view

Power pins +5V shown
GND not shown except for 7218

denotes 16p DIL

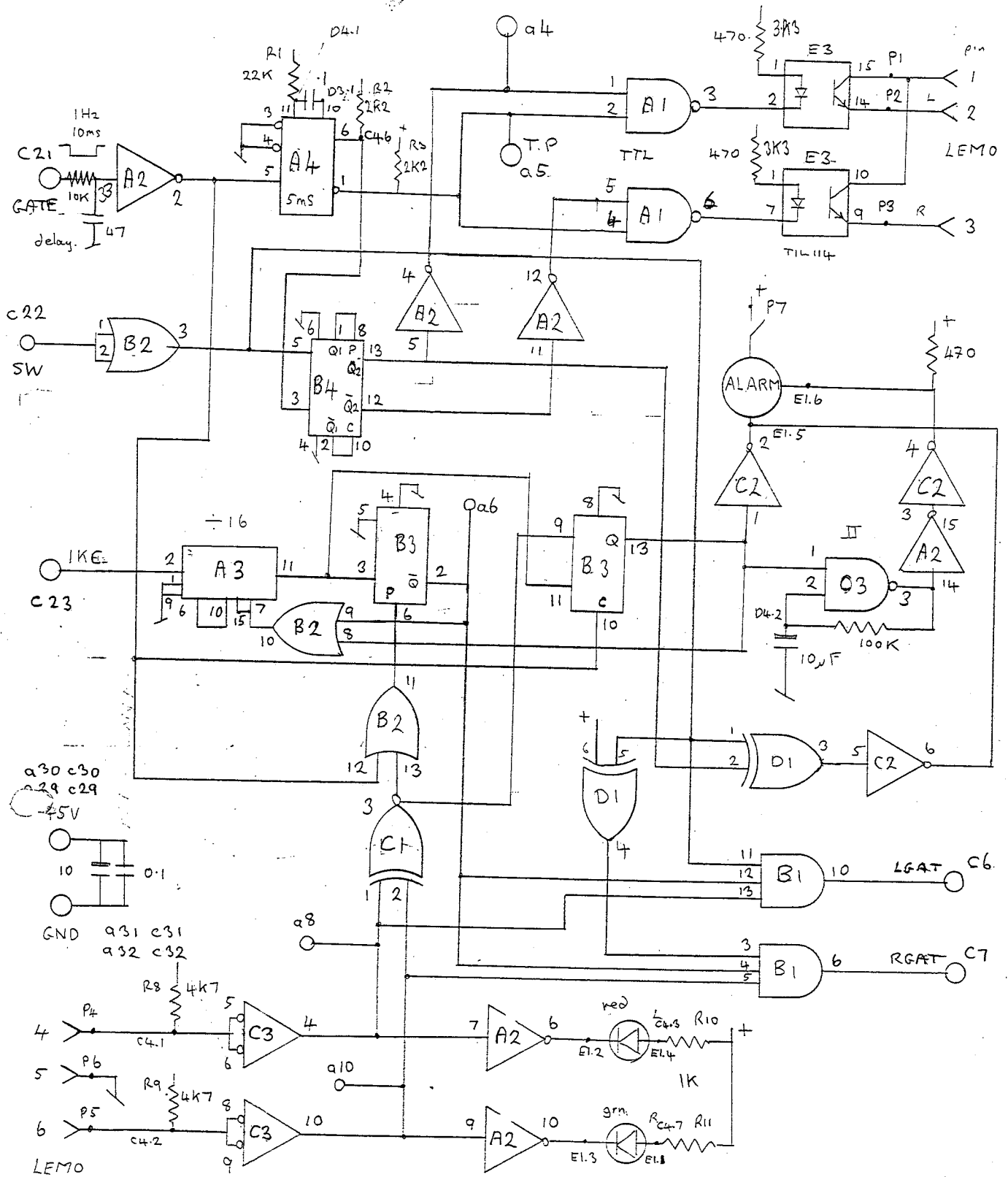


NOTE: MODULES MODIFIED TO CONTAIN WIRE WRAP BOARD. 2 EXTRA HOLES IN FRONT PANEL, MOD TO REAR FRAME.

MK 1 A

EOLM SWITCH CONTROL

C.P. McLeod Jan 1984

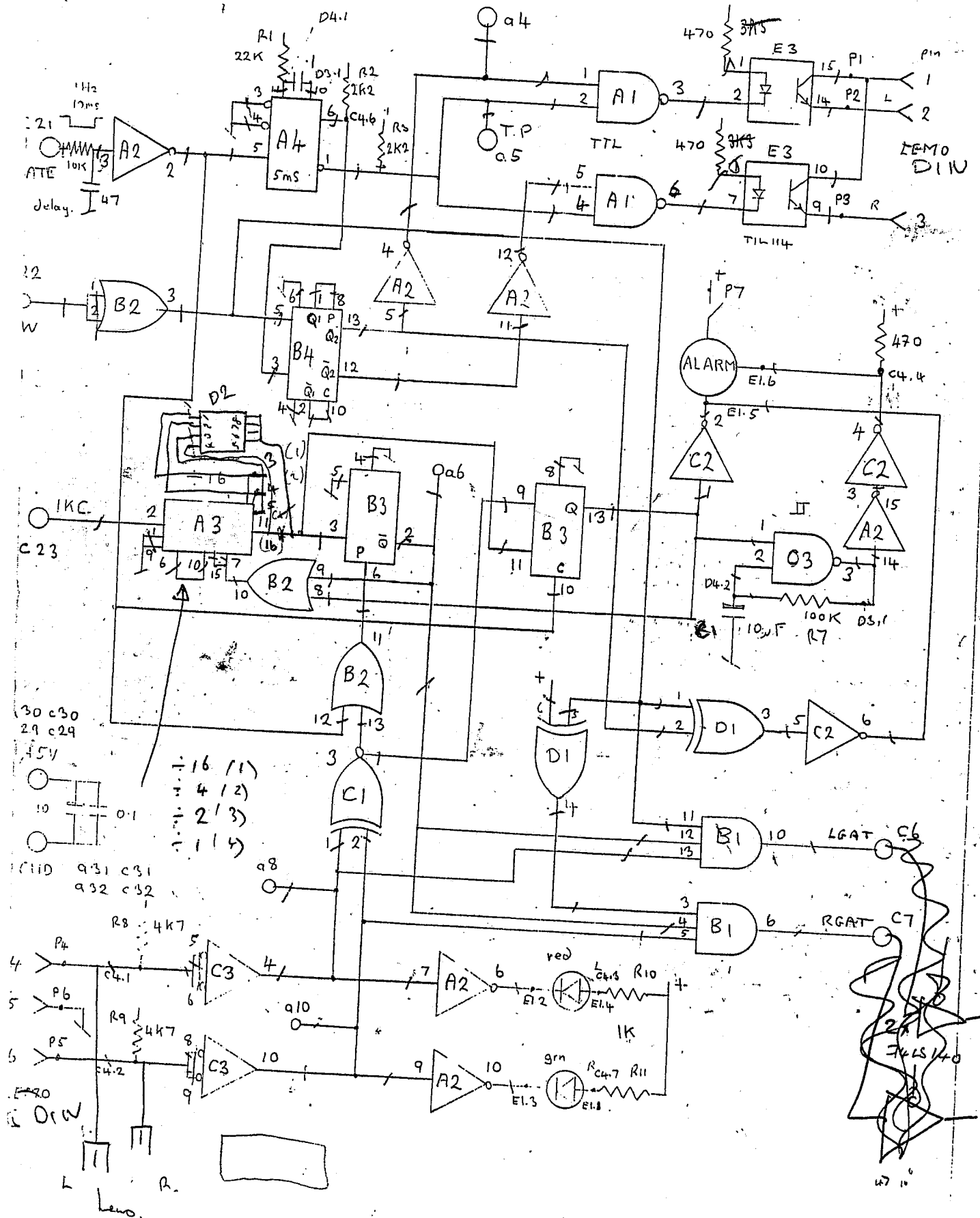


RGAT ON WHEN SW IS H.

1K1A

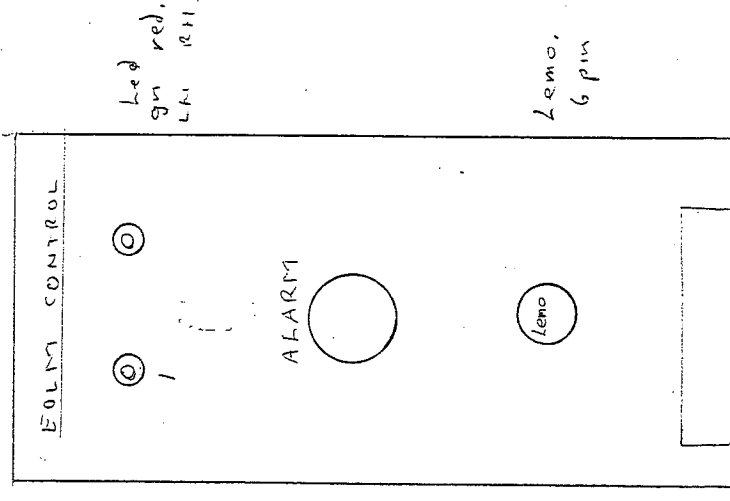
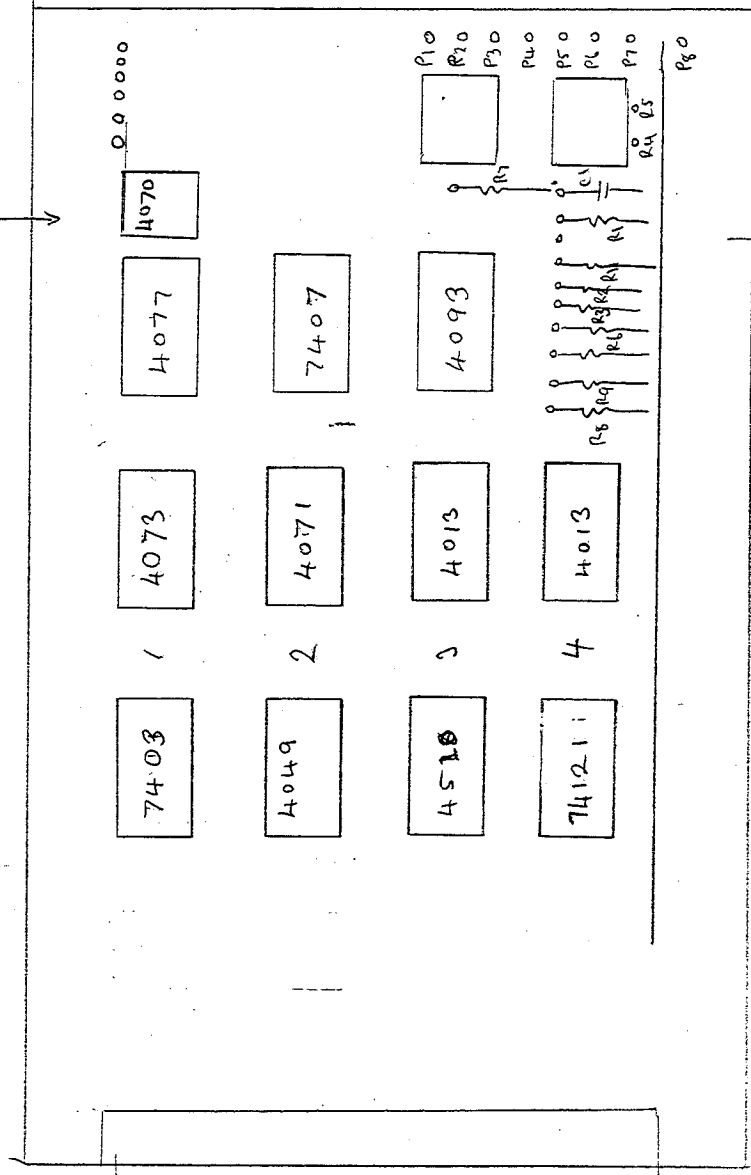
EOLM SWITCH CONTROL

C.P. McLeod Jan 1984



MX1A EOLM SWITCH CONTROL MODULE

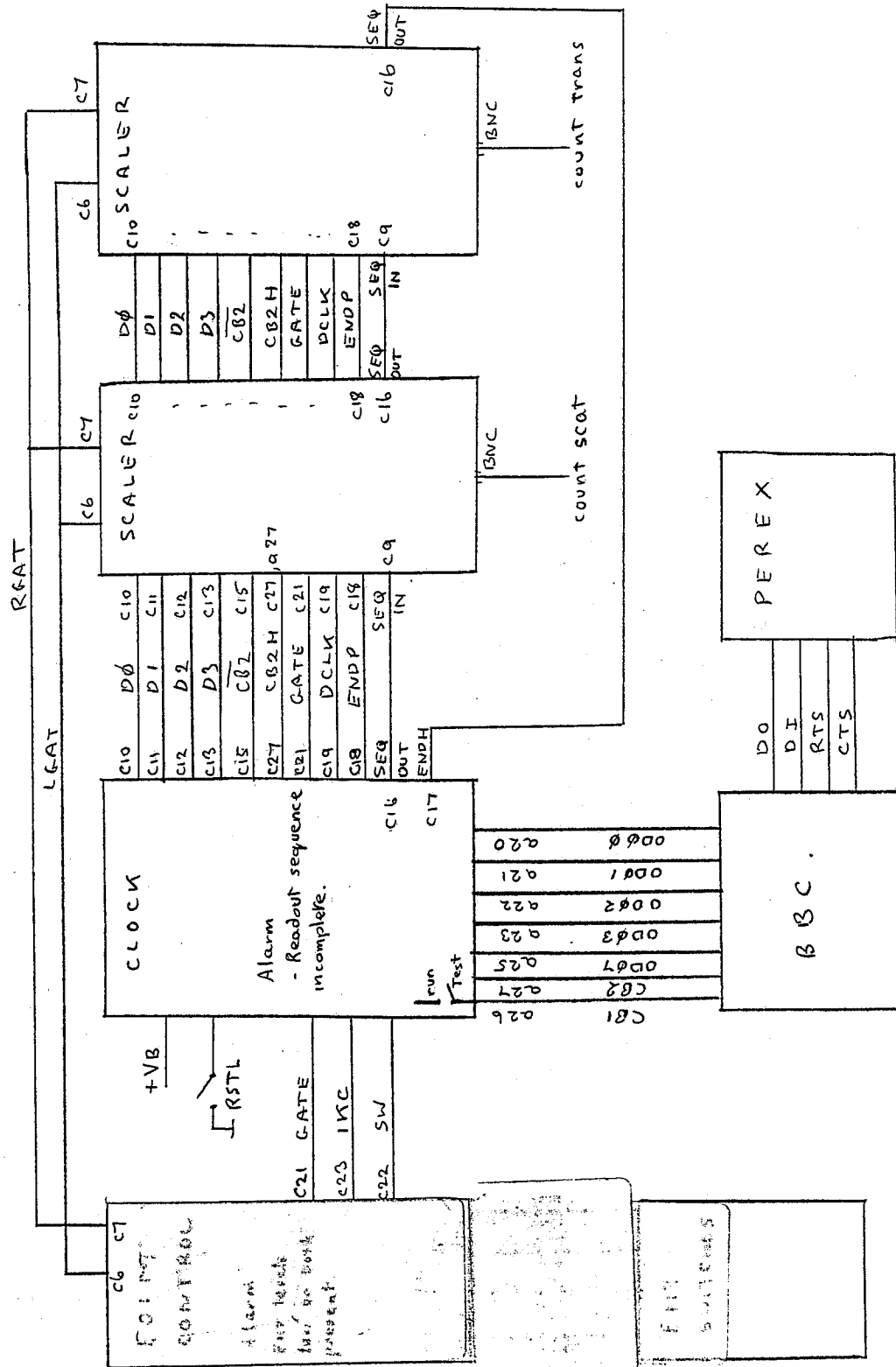
A B C D E



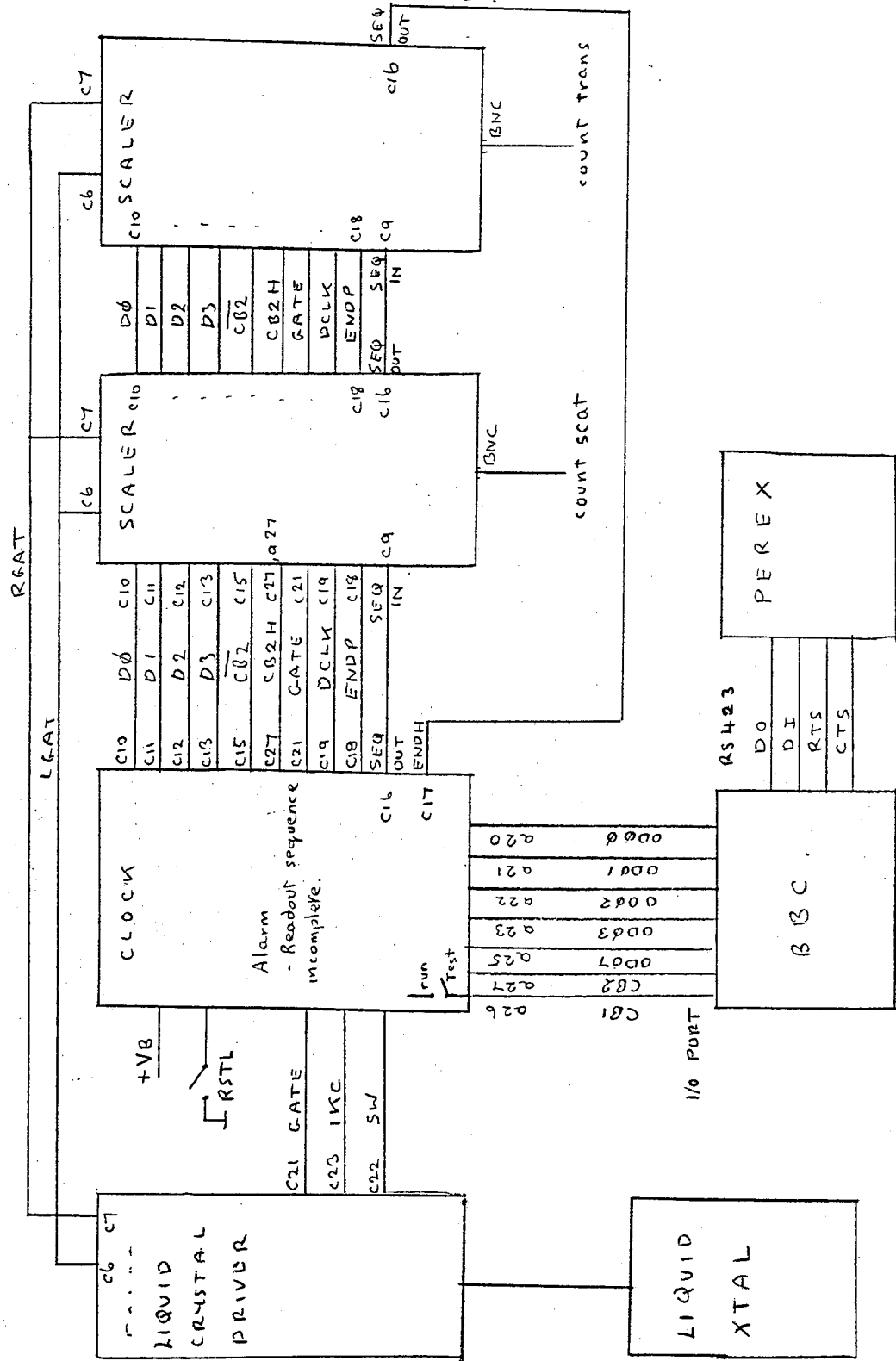
Led red.
Lem RH.

Lemo.
6 pin

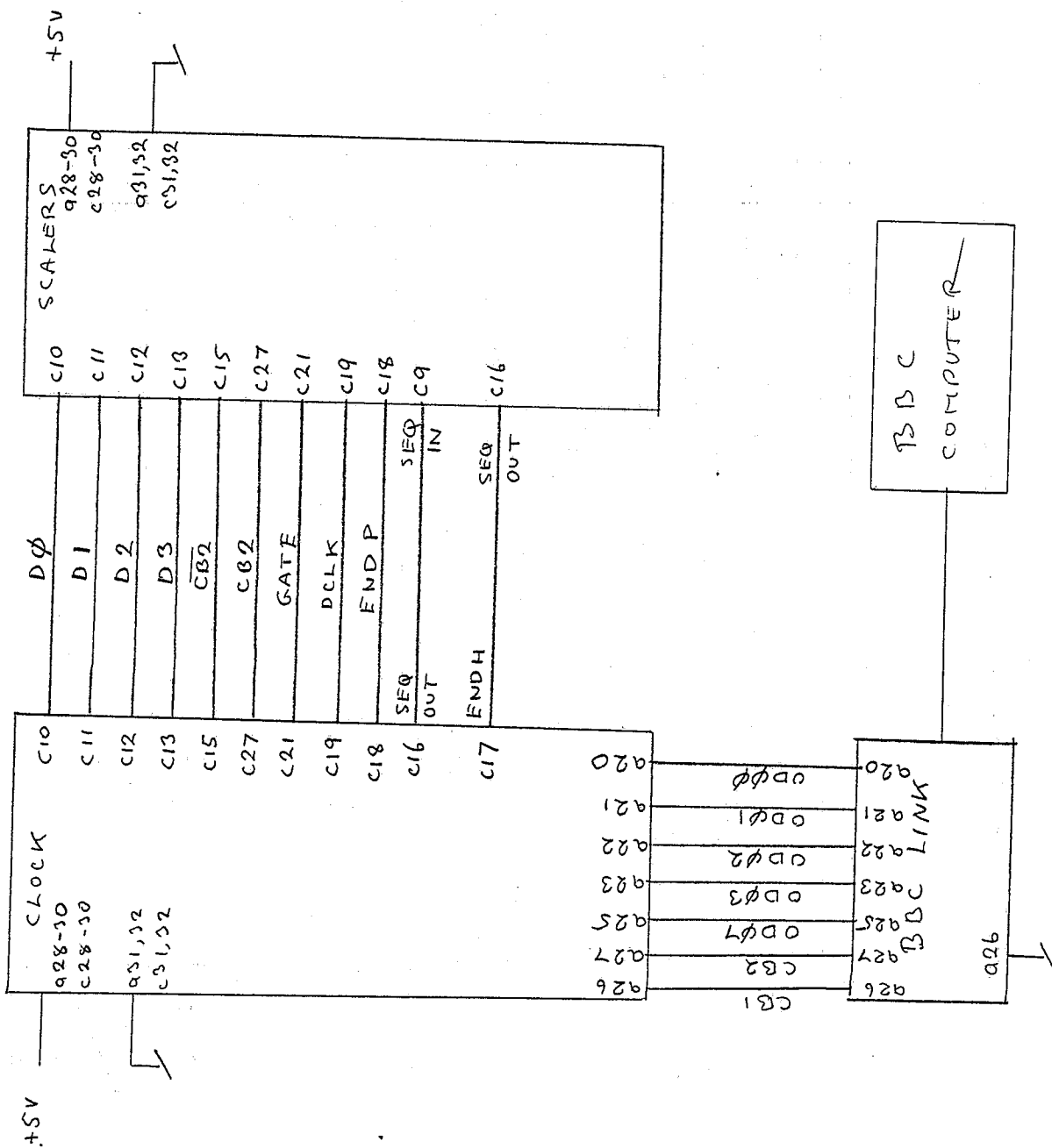
MK1A INTERCONNECTIONS

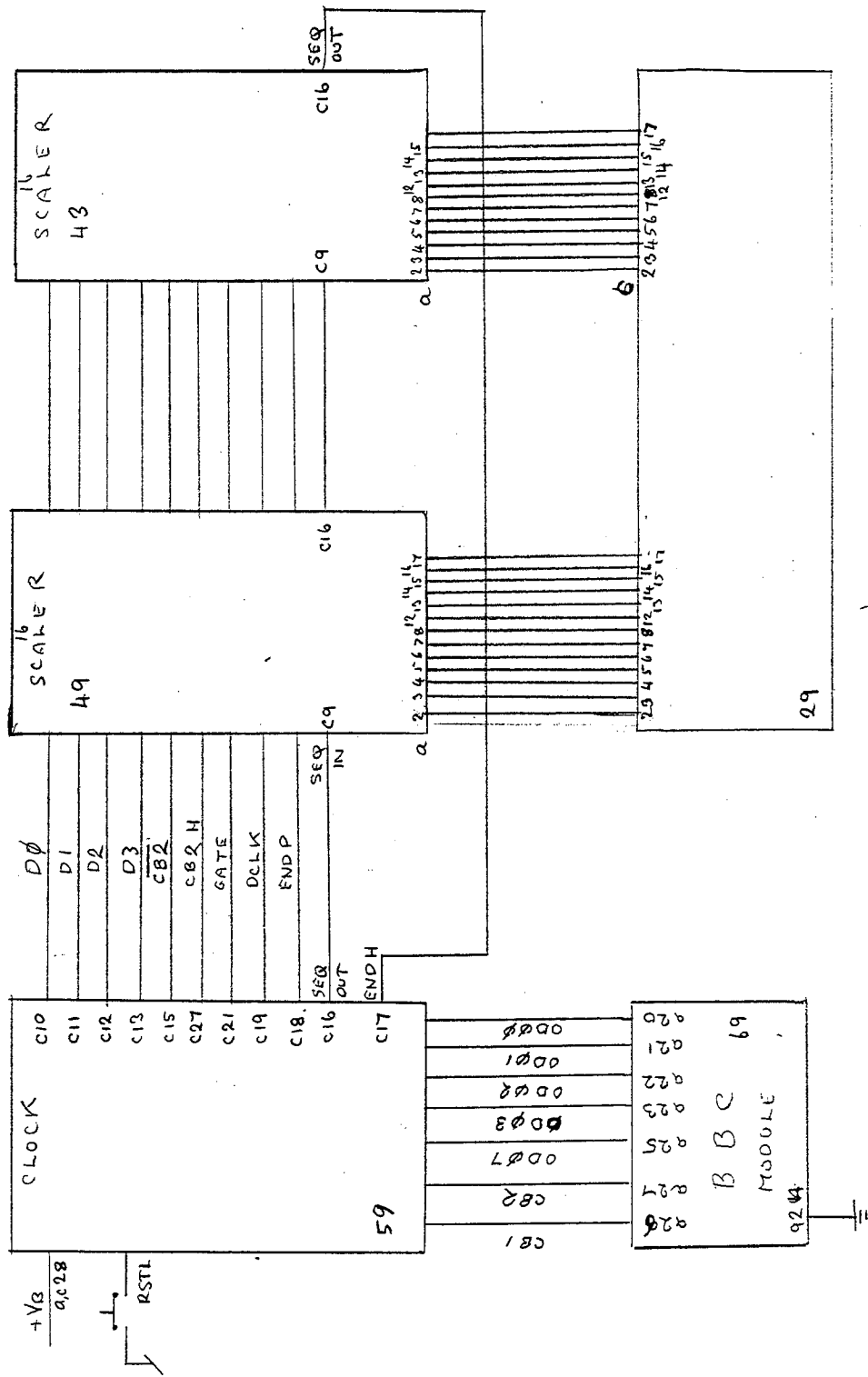


MK1A INTERCONNECTIONS

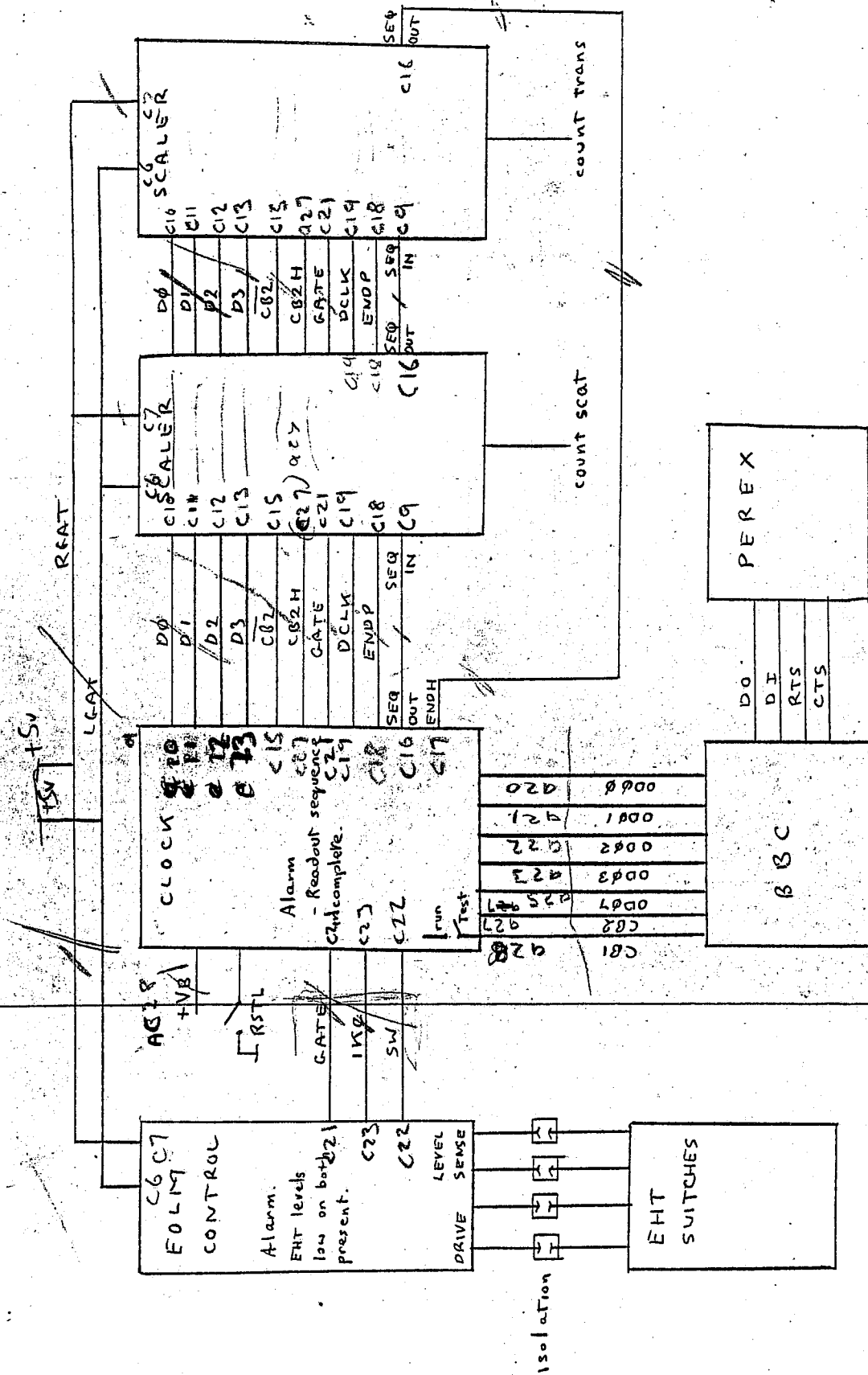


BBC SCALERS - REAR PLANE CONNS





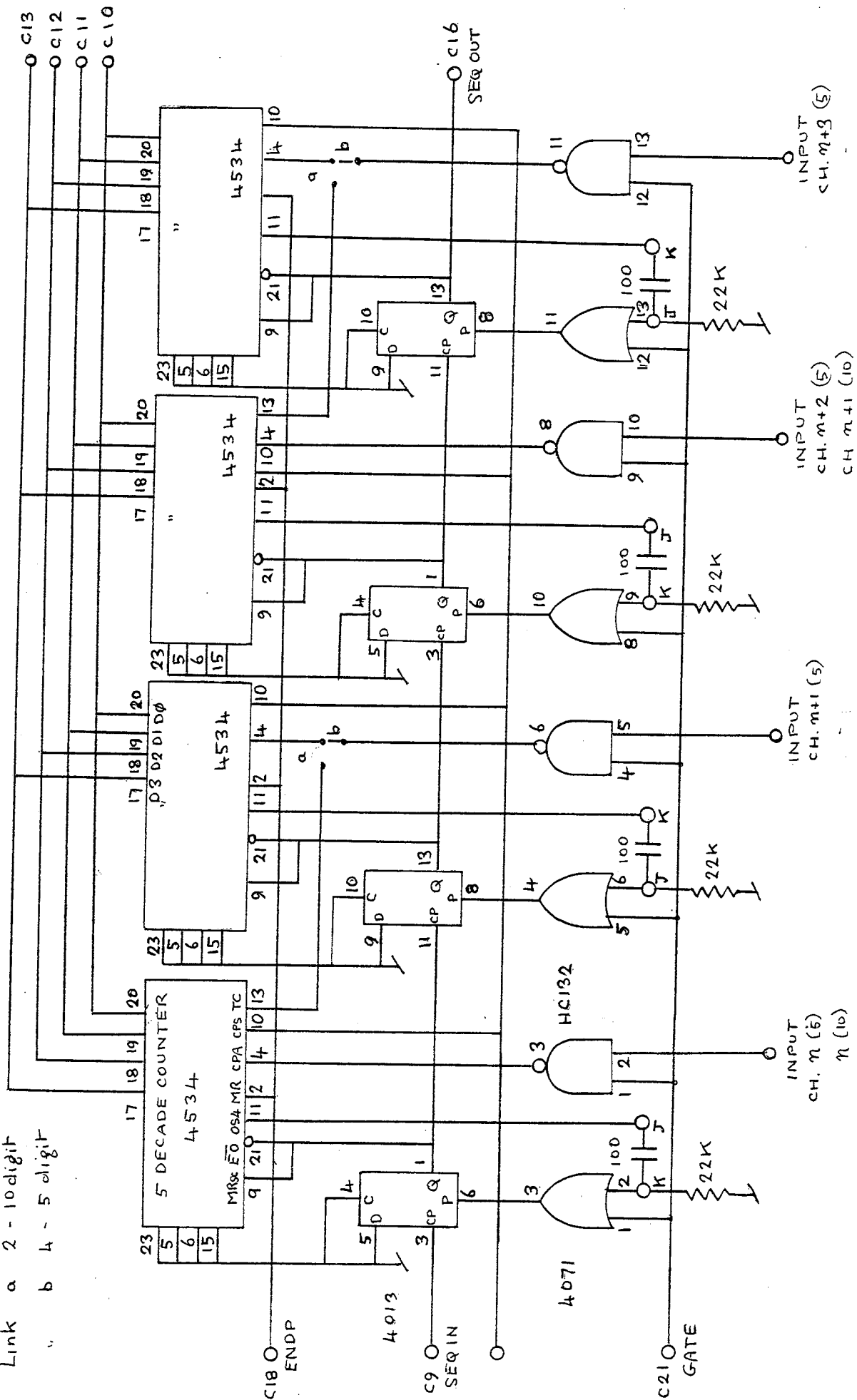
Ida.



HIGH DENSITY SCALERS - 4 - 5 DIGIT SHOWN: REPEAT FOR 8, etc.

Link a 2 - 10 digit

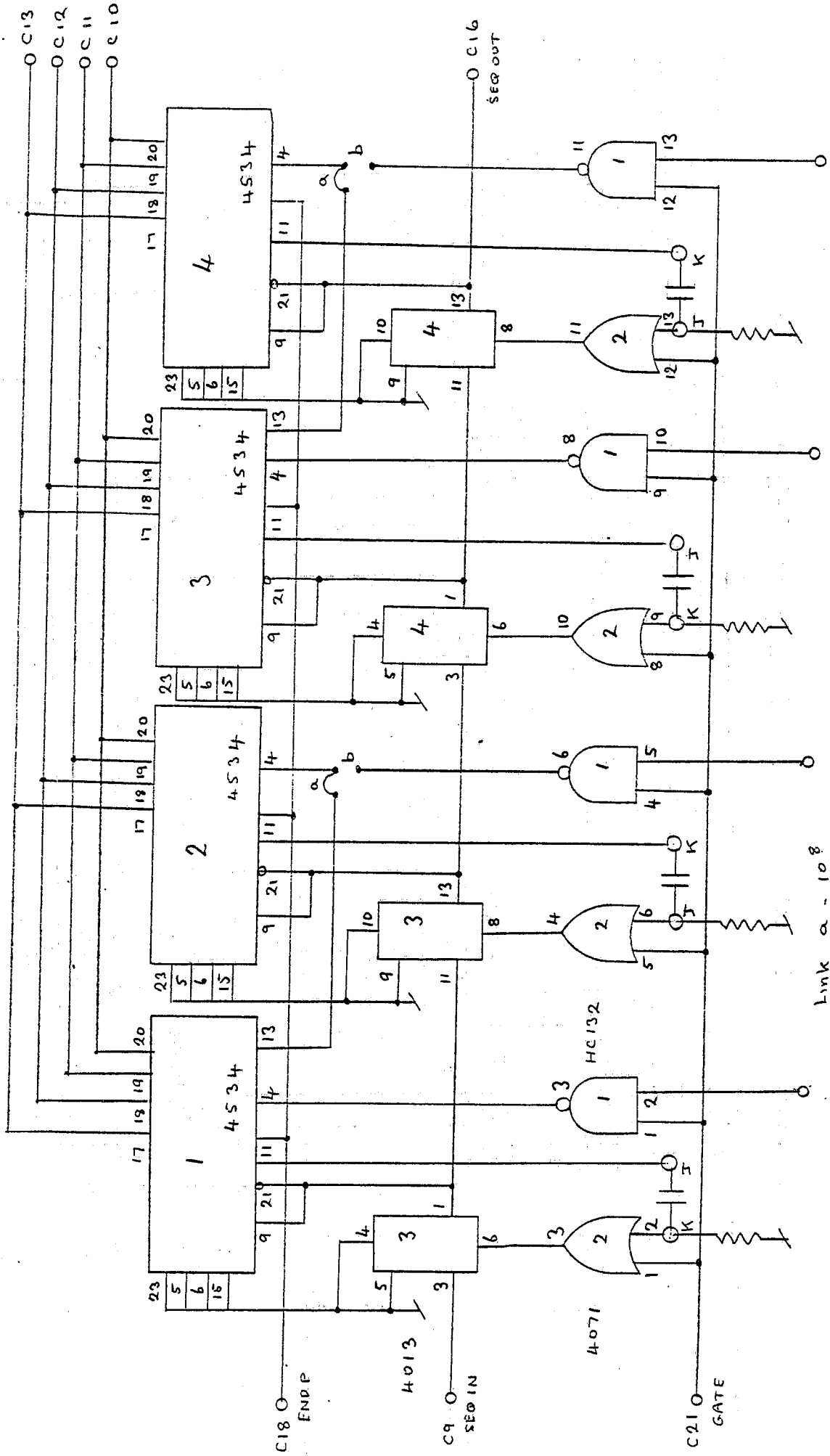
b 4 - 5 digit



HIGH DENSITY SCALERS

16 SCALERS / BOARD - 4 SHOWN

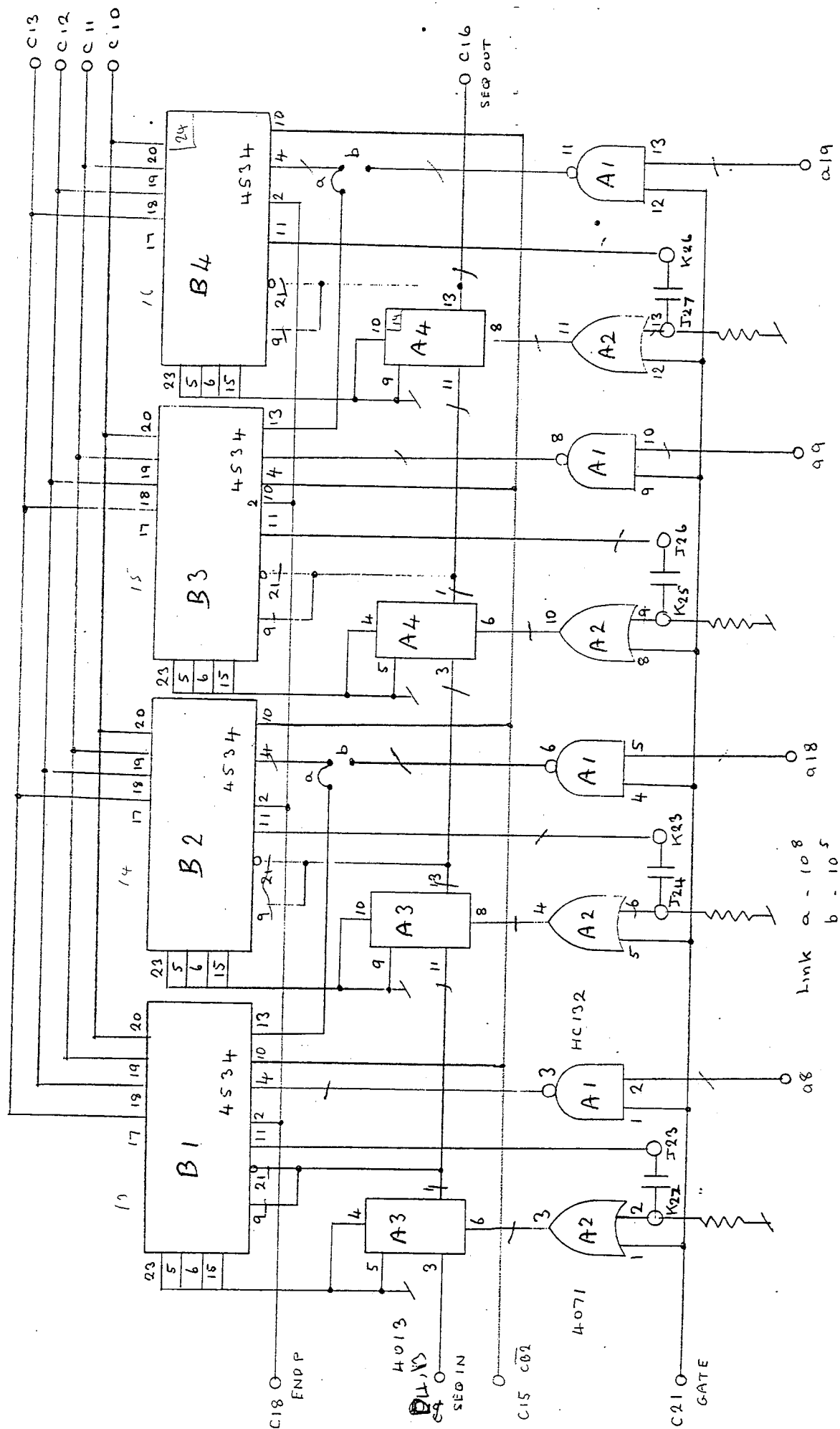
C.M.C. 1690
OCT 85



Link a - 10 8
b - 10 5

16 SCALES/BOARD - 4 SHOWN

58 L20
C. M. C.

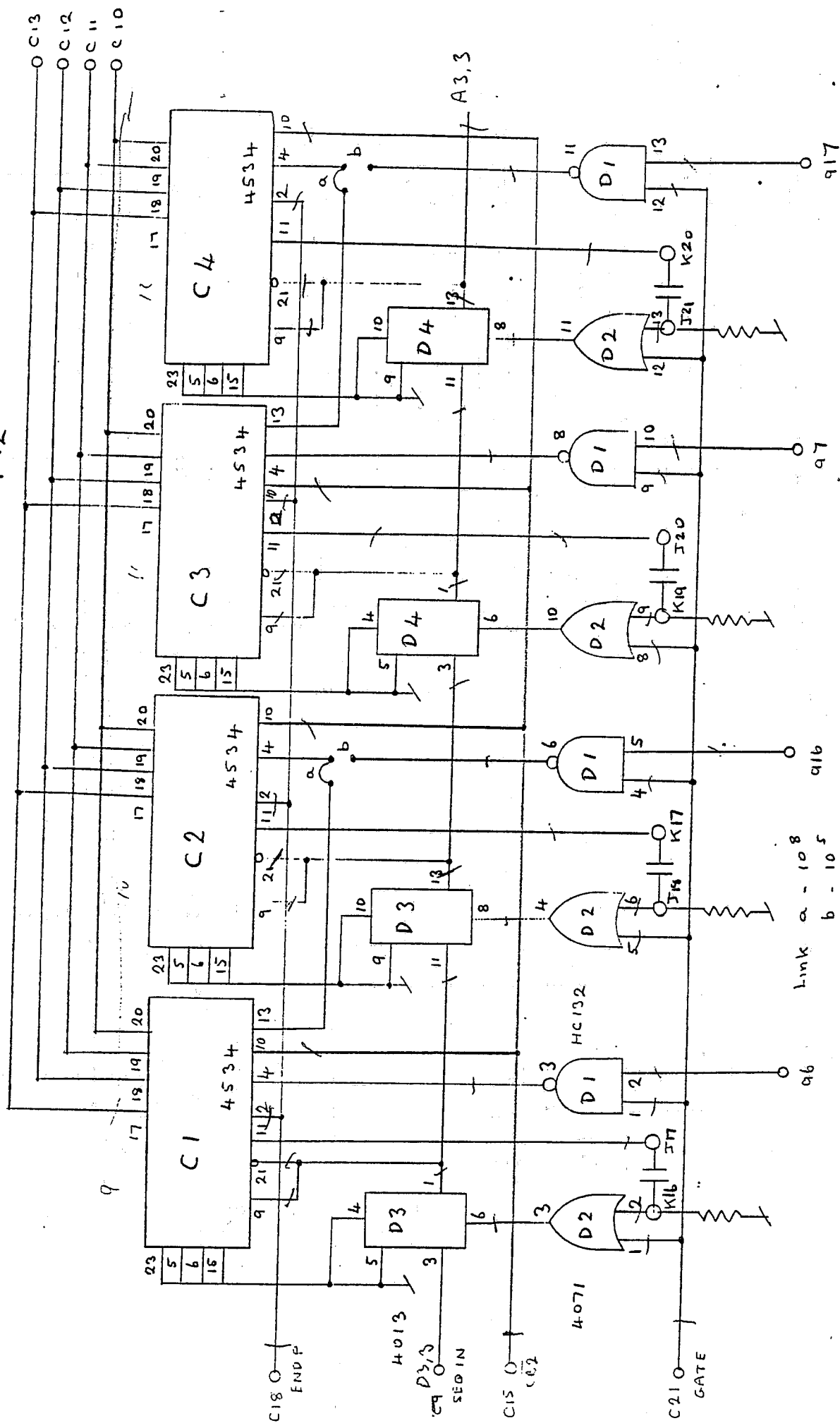


HIGH DENSITY SCALERS

16 SCALERS / BOARD - 4 SHOWN

9-12

C.McLEOD
OCT 85

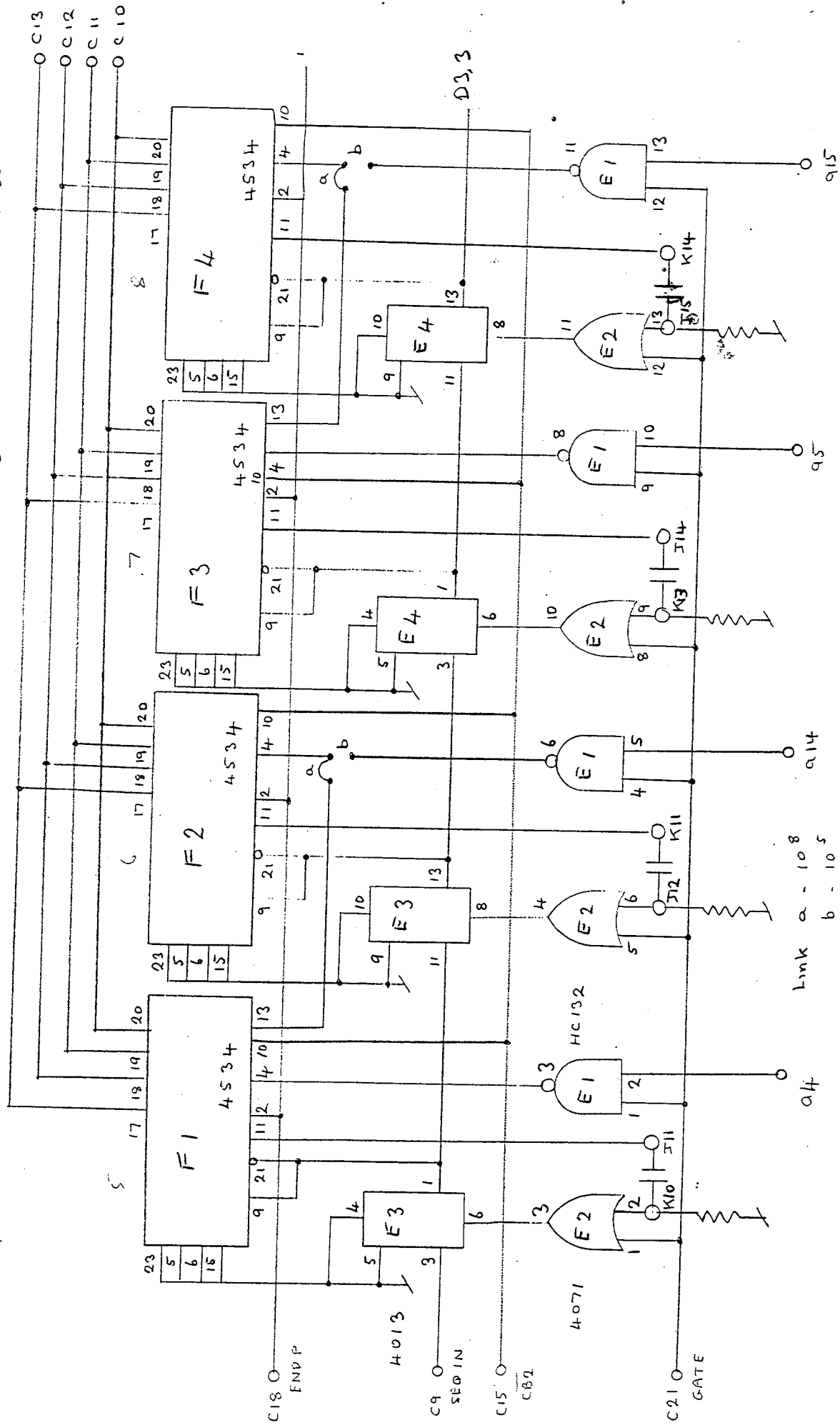


HIGH DENSITY SCALERS

16 SCALERS / BOARD - 4 SHOWN

5-8

C.M.C. 6000
CMT 85

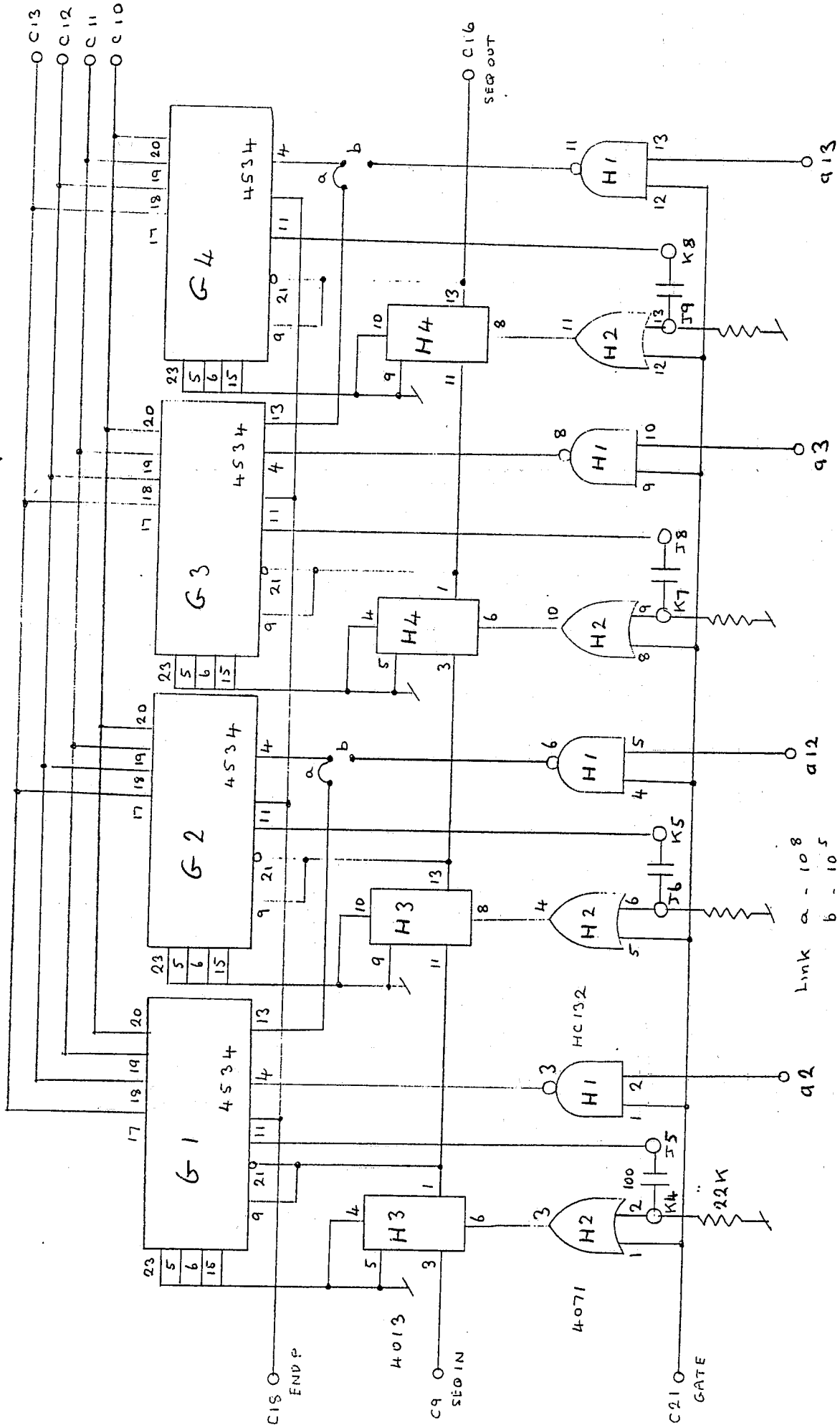


HIGH DENSITY SCALERS

16 SCALERS / BOARD - 4 SHOWN

C.McLEOD
OCT 85

1-4



6-3-90

2 x F.V.

32
35

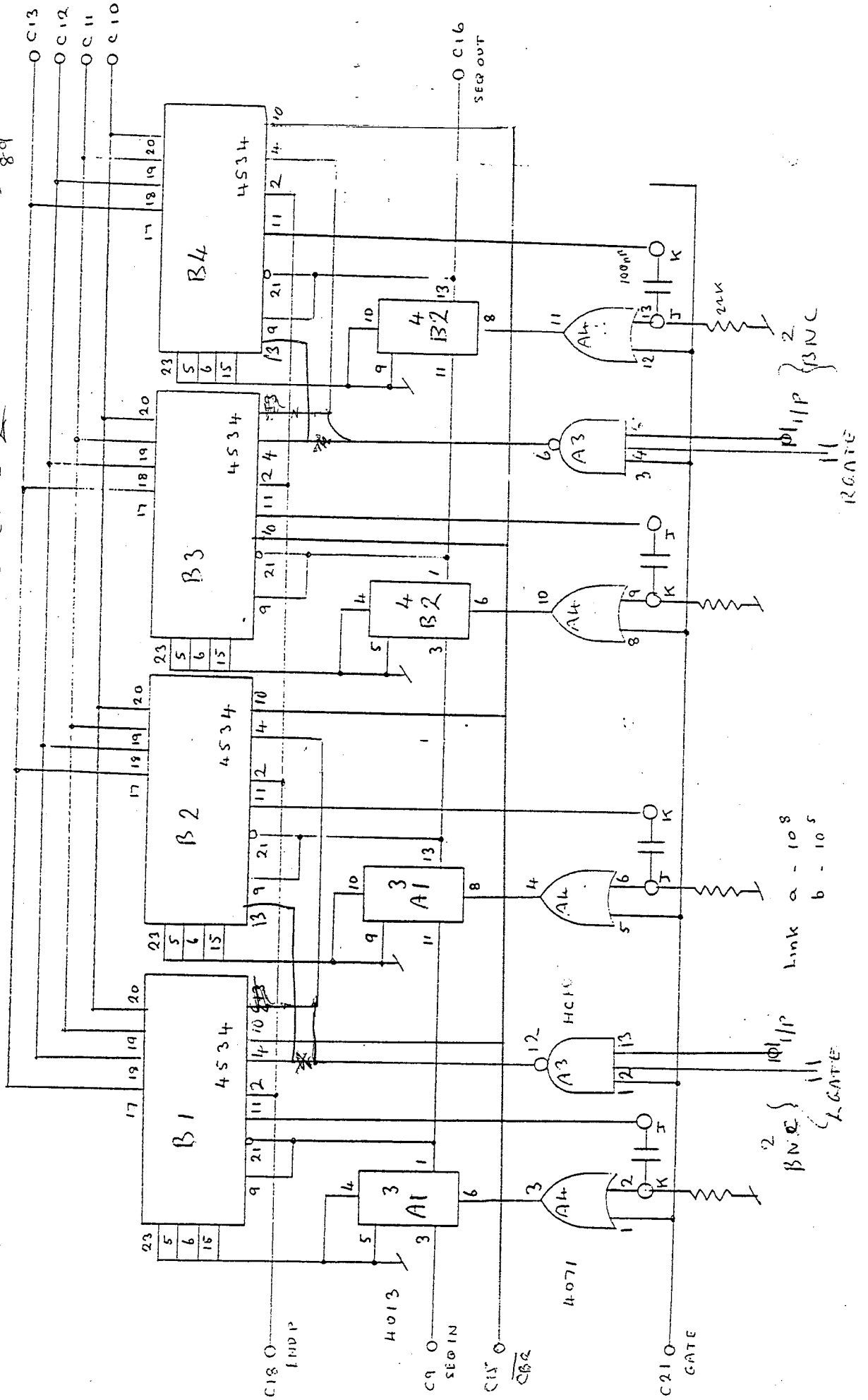
LUNAR

HIGH DENSITY SCALERS

2 X 10 decade scalers

16 SCALERS/BOARD

C.M.C. 600
or 8-9



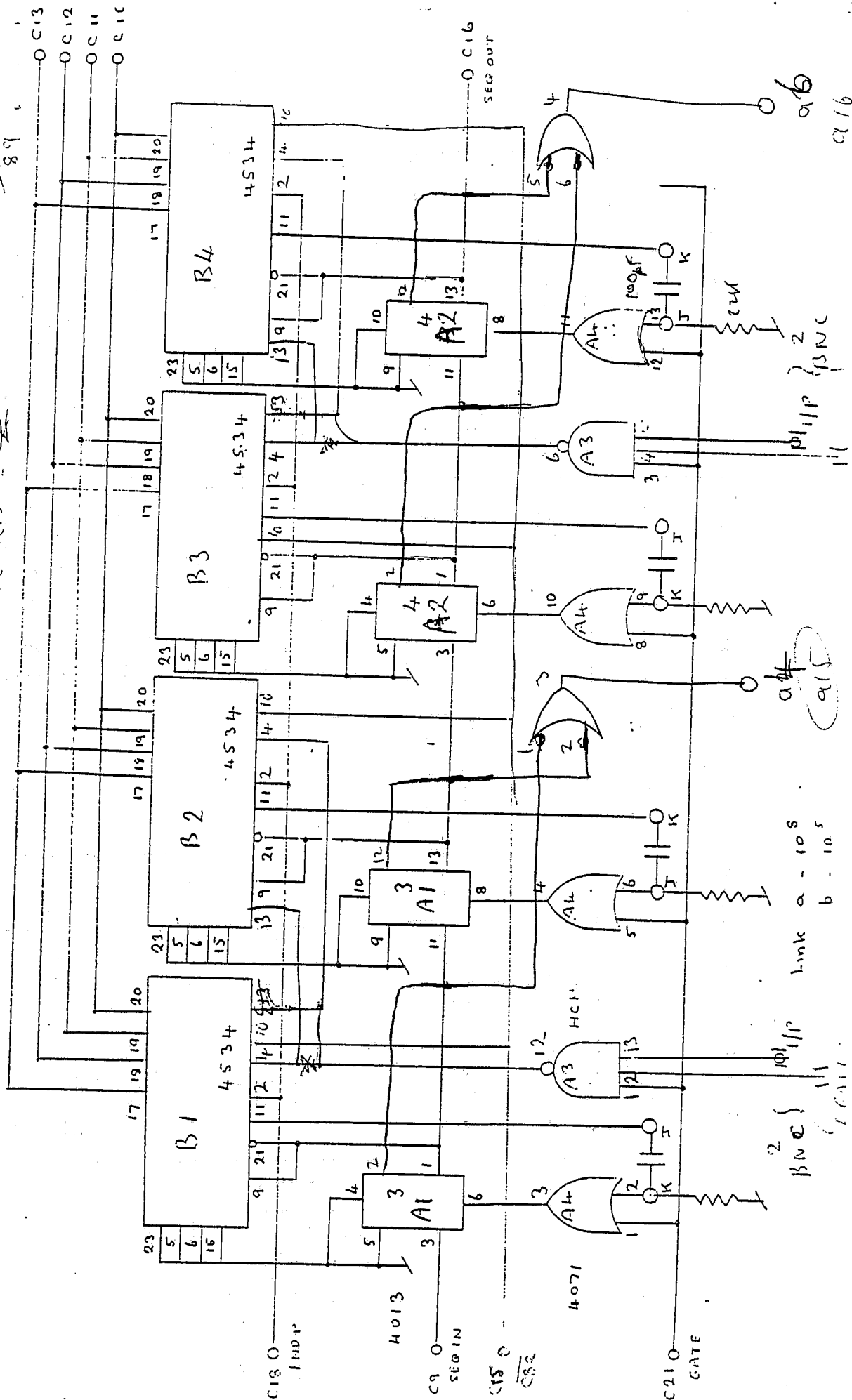
HIGH DENSITY SCALERS

2 X 10 decade scalers

16 SCALERS / BOARD

14 stations

2

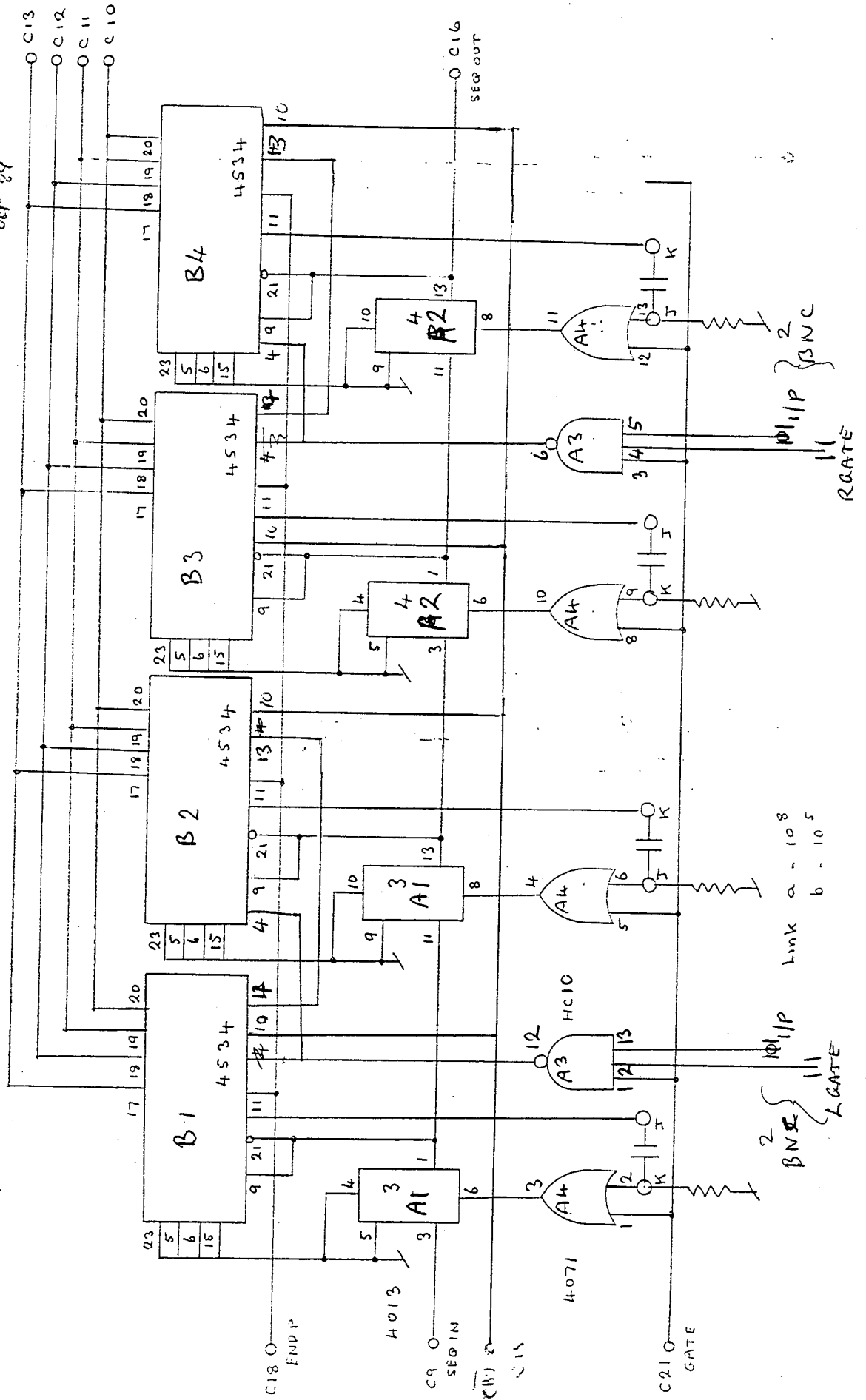


LUNAR.

HIGH DENSITY SCALERS

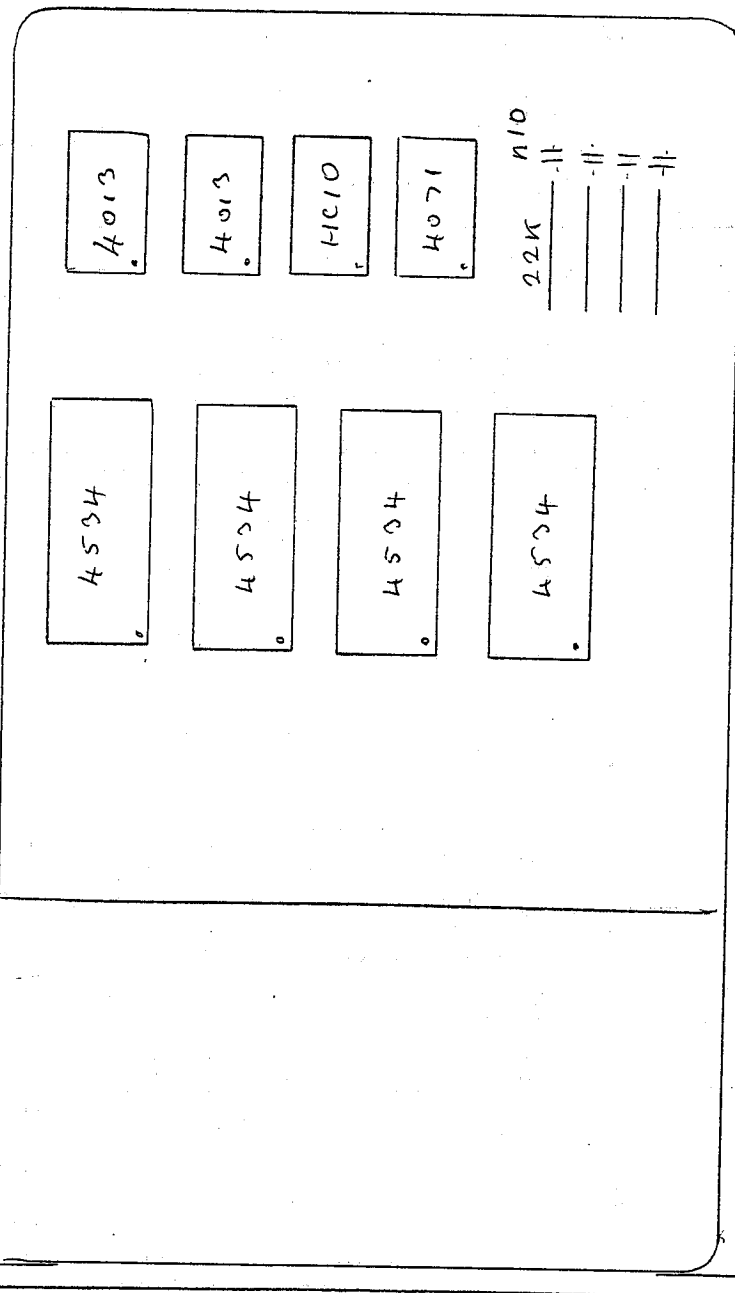
SCALERS / DAA02 - 14 STROBE

C.M.C. 1000
Oct 89
Oct 89

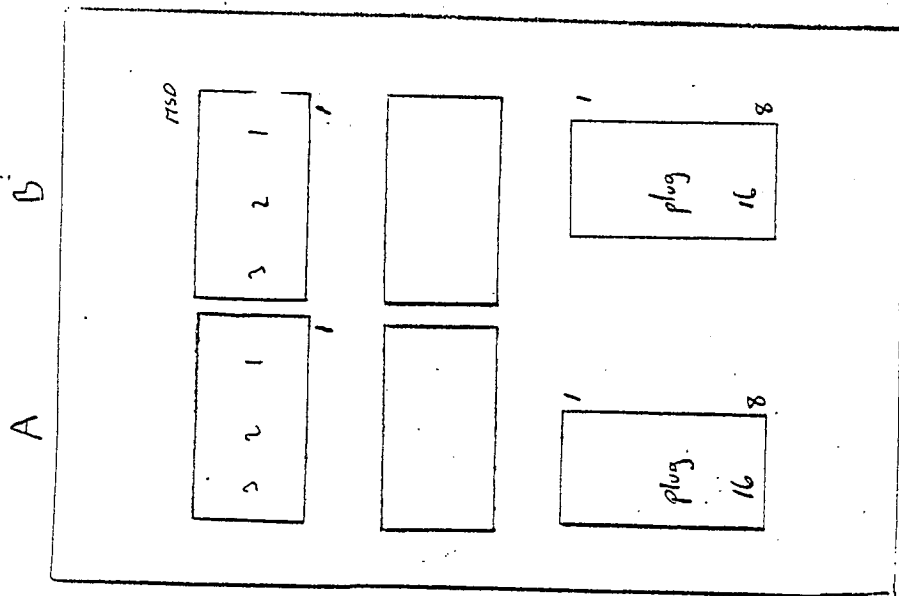


2 x 10 DIGIT SCALER LAYOUT.

B A



MK1A SCALER DISPLAY BOARD



A3 B3

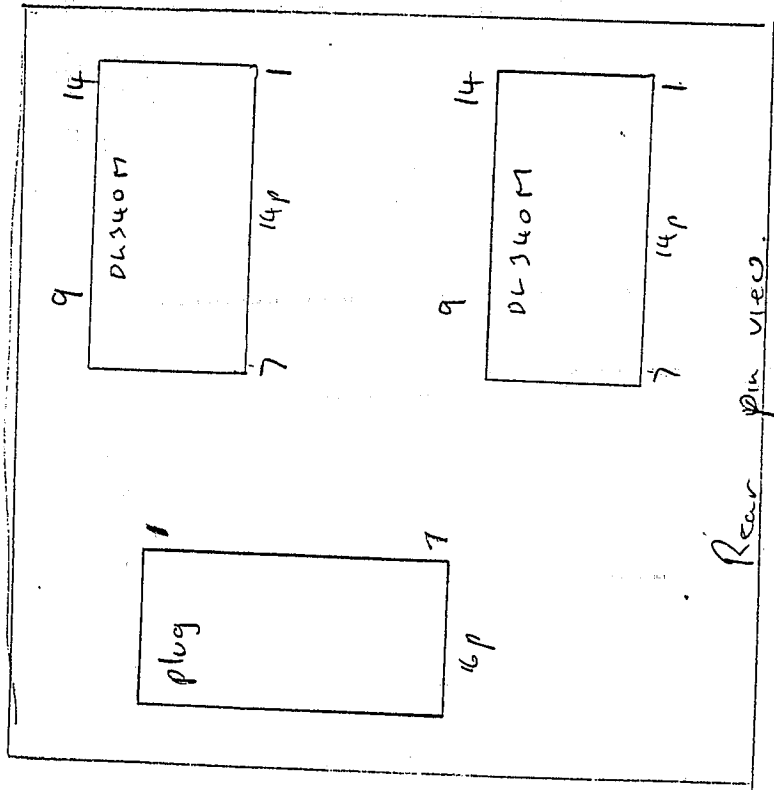
Pin	A3/B3	A1	D1	A2	D2
1	q 3-9	10	10	10	10
2	b	8	8	8	8
3	c	5	5	5	5
4	d	3	3	3	3
5	e	2	2	2	2
6	f	11	11	11	11
7	g	9	9	9	9
8					
9	DIC 1	7		7	
10	2	4		4	
11	3	1		1	
12	4		7		7
13	5		4		4
14	6		1		1

7218 Display 3
4
25
3
1
26
2 MSD 1
12 plug 9
goes to msd of display driver pin 2

12-4
10-7

MK I A DISPLAY BOARD CLOCY

A B

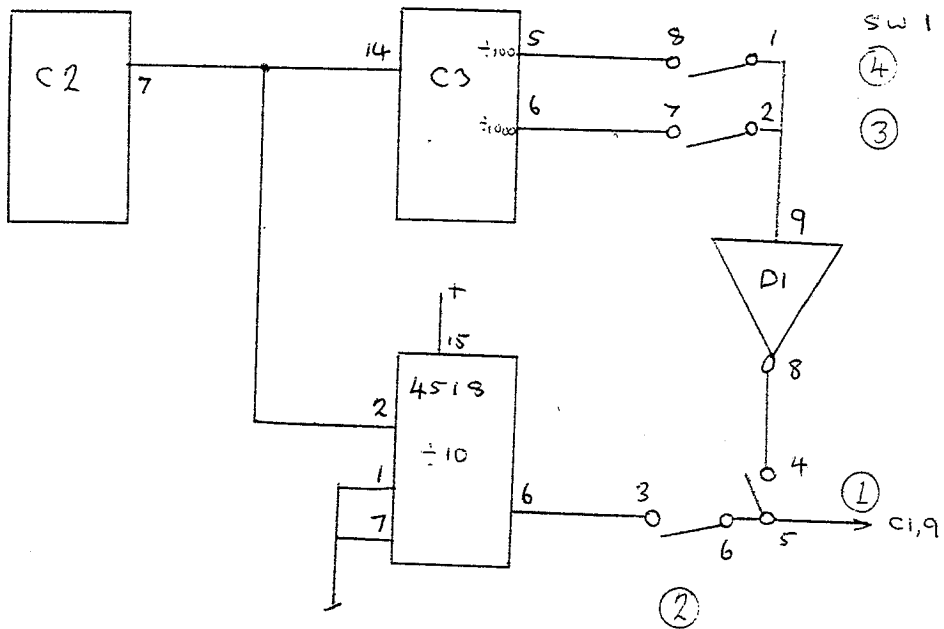


pin	A1	B1	B2
1	a	13	13
2	b	9	9
3	c	4	4
4	d	3	3
5	e	2	2
6	f	11	11
7	g	6	6
8			
9	DIG 1		7
10	2		10
11	3		12
12	4		14
13	5	7	
14	6	10	
15	7	12	
16	8 MSD	14	

NB. DISPLAY DIG 1 MSD.
7218D DIG 1 LSD.

MX 1A CLOCK - MOD FOR CIS LAB EXPT

PROVIDES SWITCHABLE CLOCK RATES

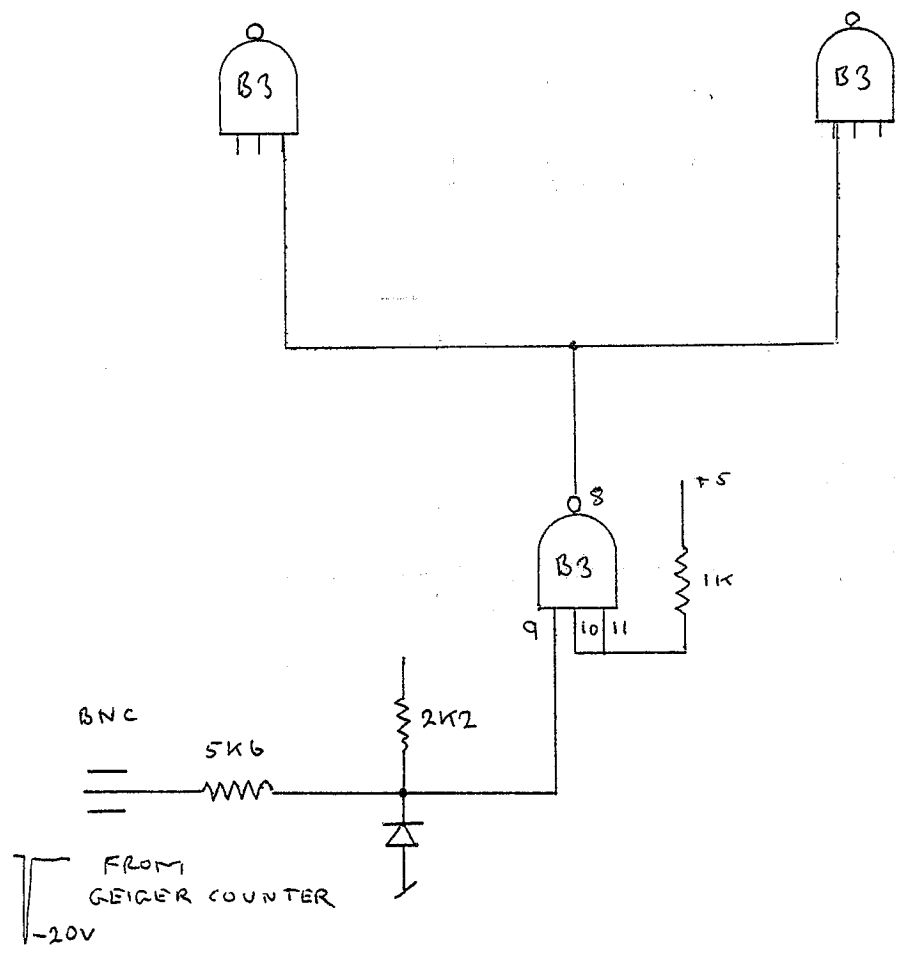


CLOCK RATES

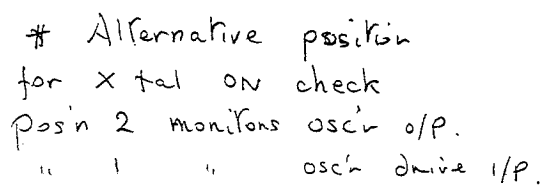
SW1	10Sec	1Sec	0.1Sec
1	ON	ON	OFF
2	OFF	OFF	ON
3	ON	OFF	X
4	OFF	ON	X

MK 1A SCALERS - MOD FOR CIS LAB EXPT.

ALLOWS INPUT FROM GEIGER COUNTER - 20V PULSES

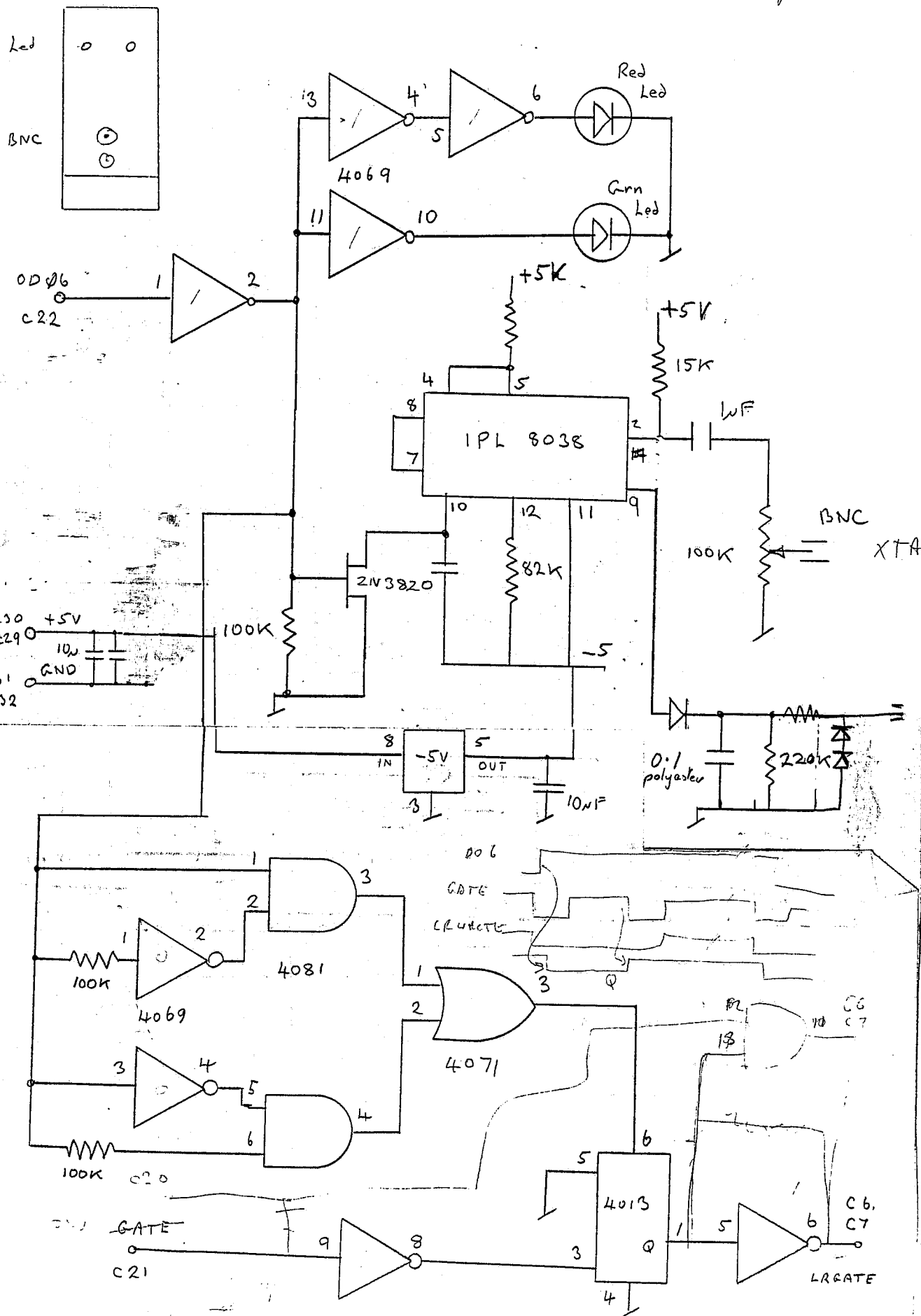


C. McClead. Apr. 1985



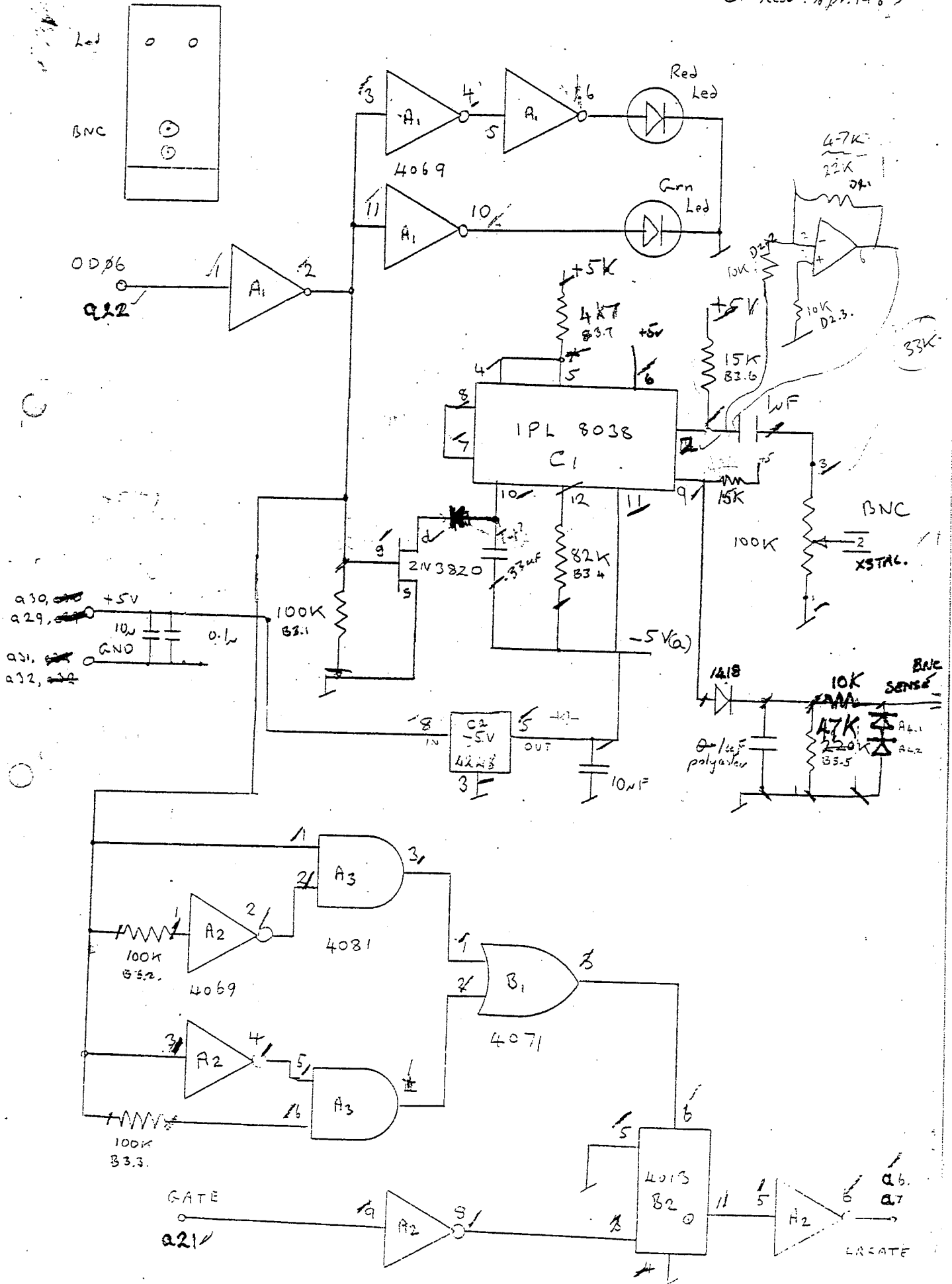
2D SCALERS LIQ. CRYSTAL DRIVER MODULE

Circuit Lead. Apr. 1987



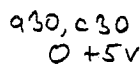
2D SCALERS LIQ. CRYSTAL DRIVER MODULE

CRC Lead. Apr. 1987



10 sec sample
1 sec delay

412V



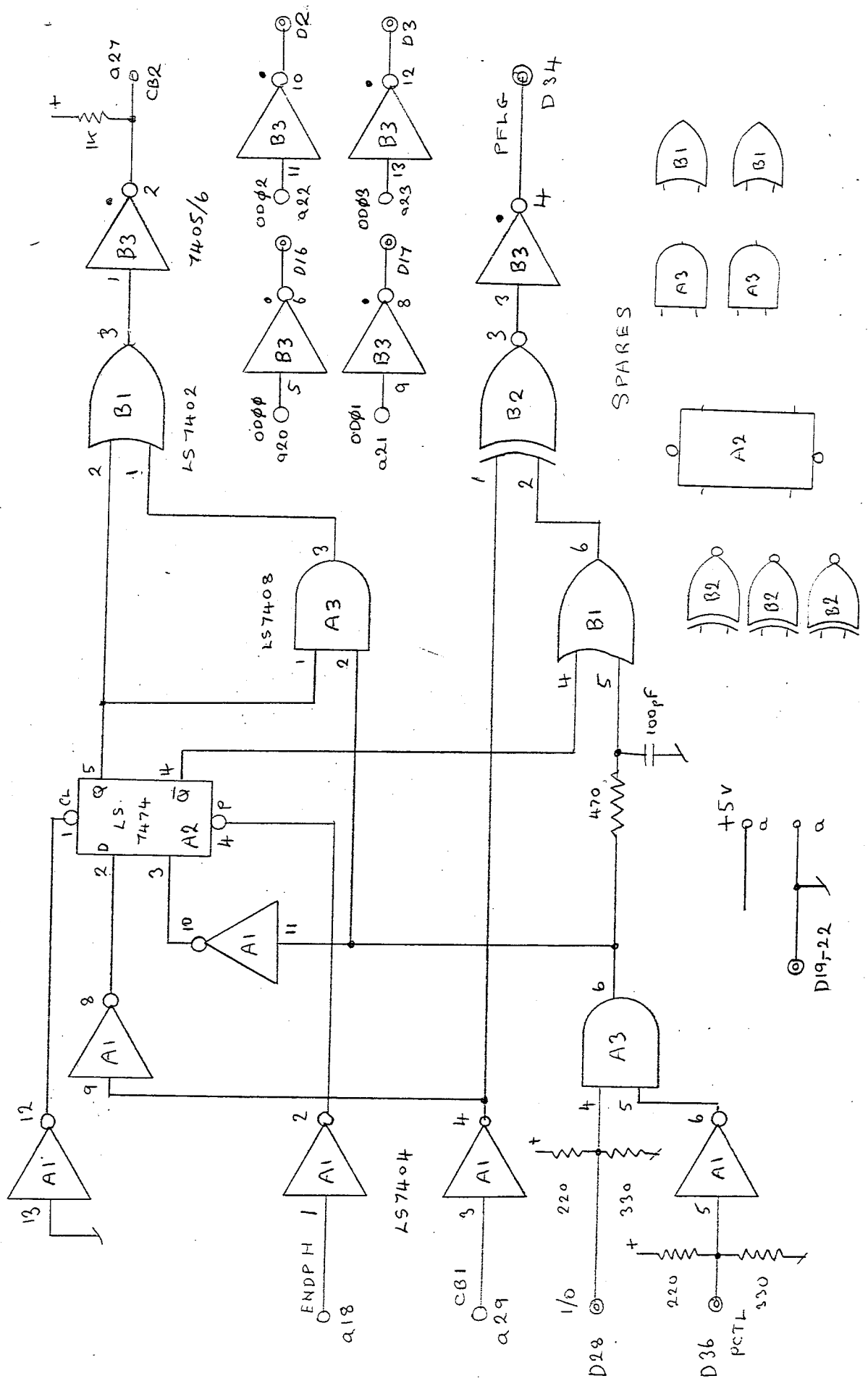
Q 931, 931

RGAT H
When LIX TAL
ON

A hand-drawn diagram of a cell. It features a large, irregular outer boundary representing the cell membrane. Inside, there is a smaller, roughly circular nucleus containing three small dots. To the right of the nucleus is a large, bean-shaped vacuole, also containing three small dots. The entire diagram is drawn with simple black lines on a white background.

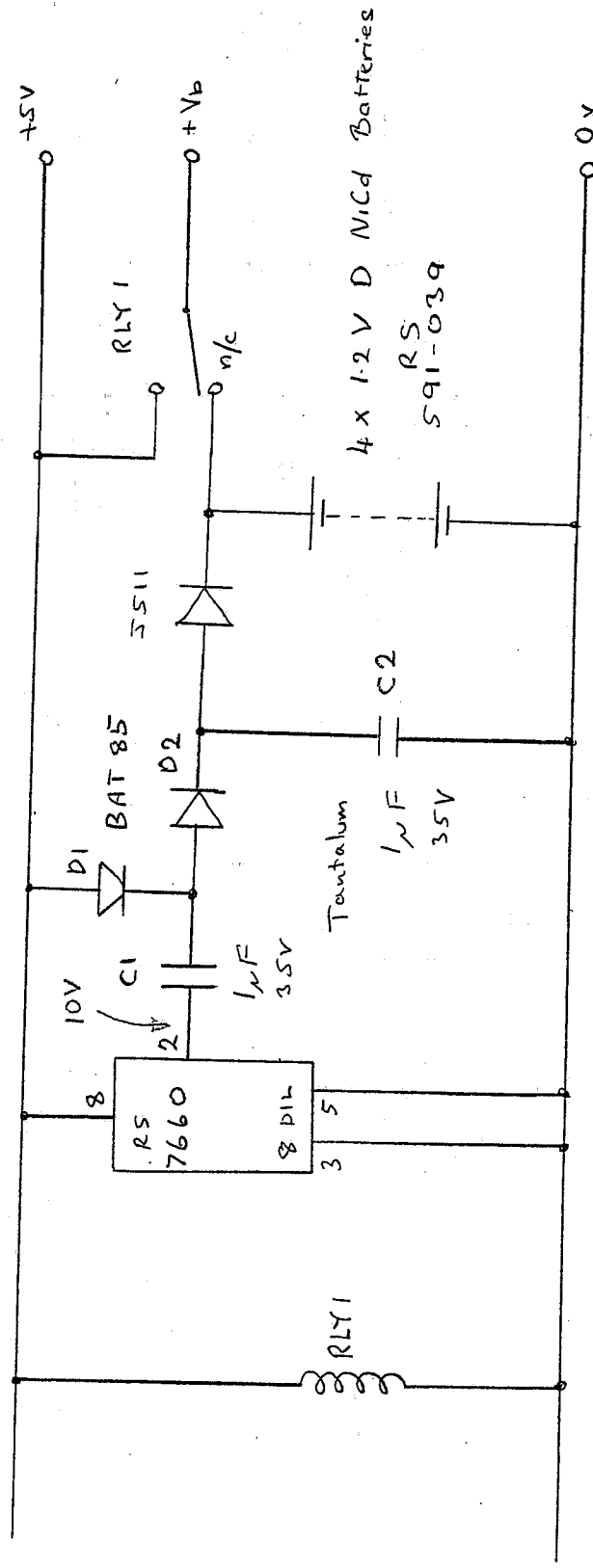
MK1A SOLICERS - BBC / HP 982 (16 BIT 1/F) CONVERTER

C.P. M'head Feb 87



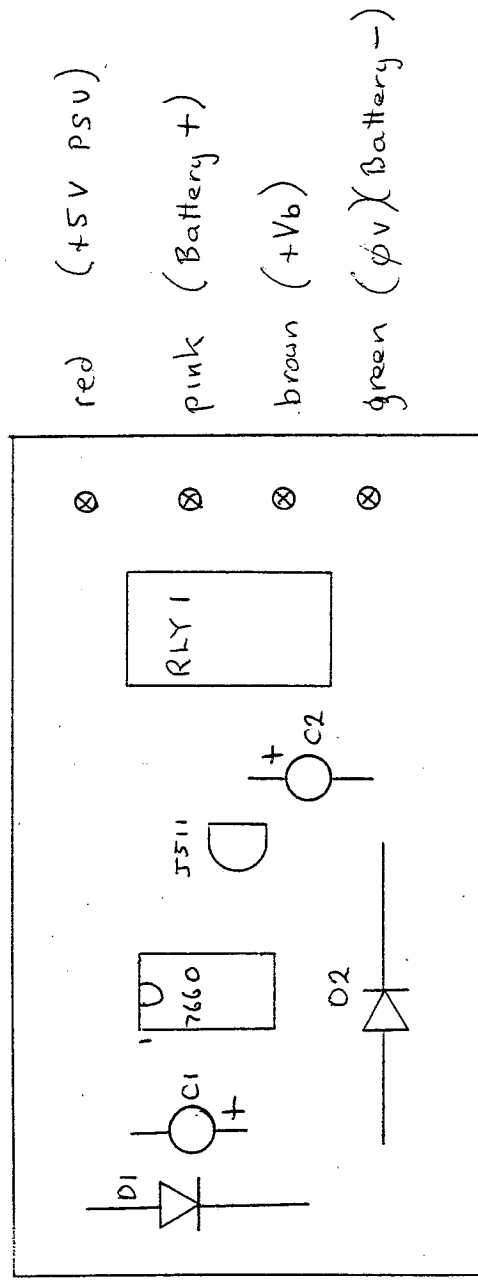
MM1A SCALERS - BATTERY BACKUP CIRCUIT

C. Michard Feb 88



- Voltage converter
RS 7660
304 598
- SILICONIX 7511
Constant current diode (4.7mA)
RS 283-508
- BAT 85
-RS 300-978

MIKIA SCARERS - BATTERY BACKUP LAYOUT

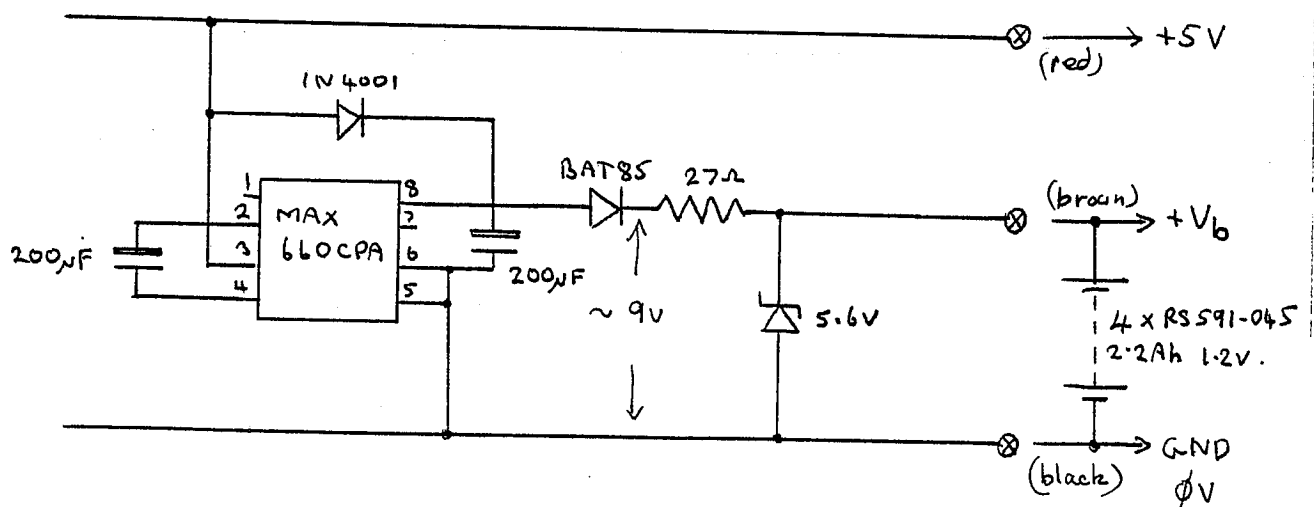
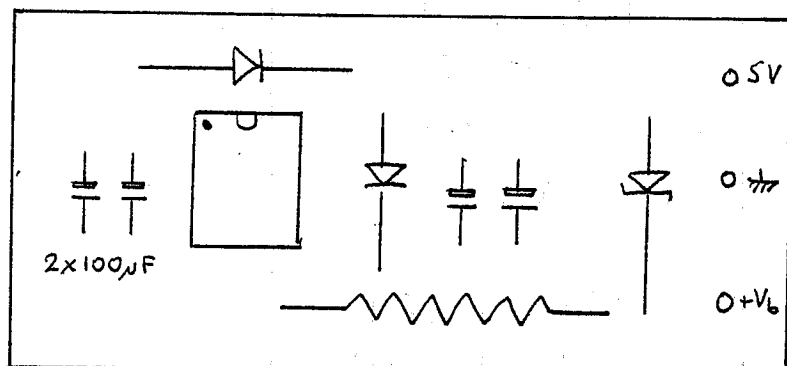


BATTERY CHARGER MOD FOR MKI CLOCK

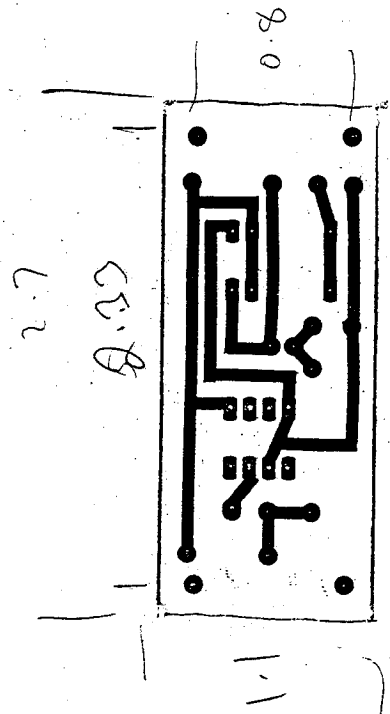
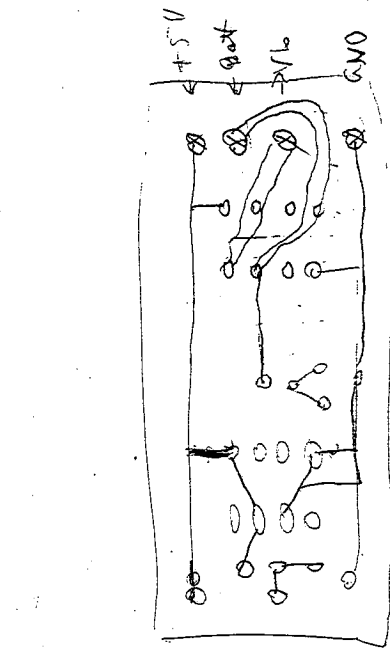
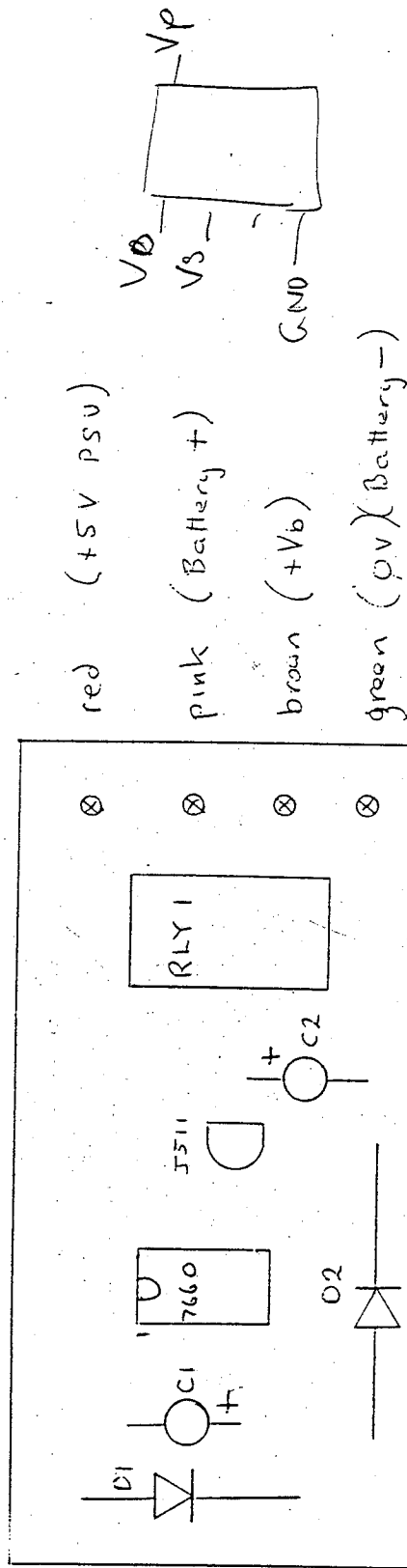
CM. Feb 93.

The clock draws $\sim 65\text{ mA}$ with power on and $\sim 2\text{ mA}$ on battery only. The battery receives $\sim 40\text{ mA}$ of charging current.

The MAX660 I.C. is configured as a voltage doubling circuit; the zener is provided for safety should the batteries be disconnected with power on.



MIKIA SCALERS - BATTERY BACKUP LAYOUT

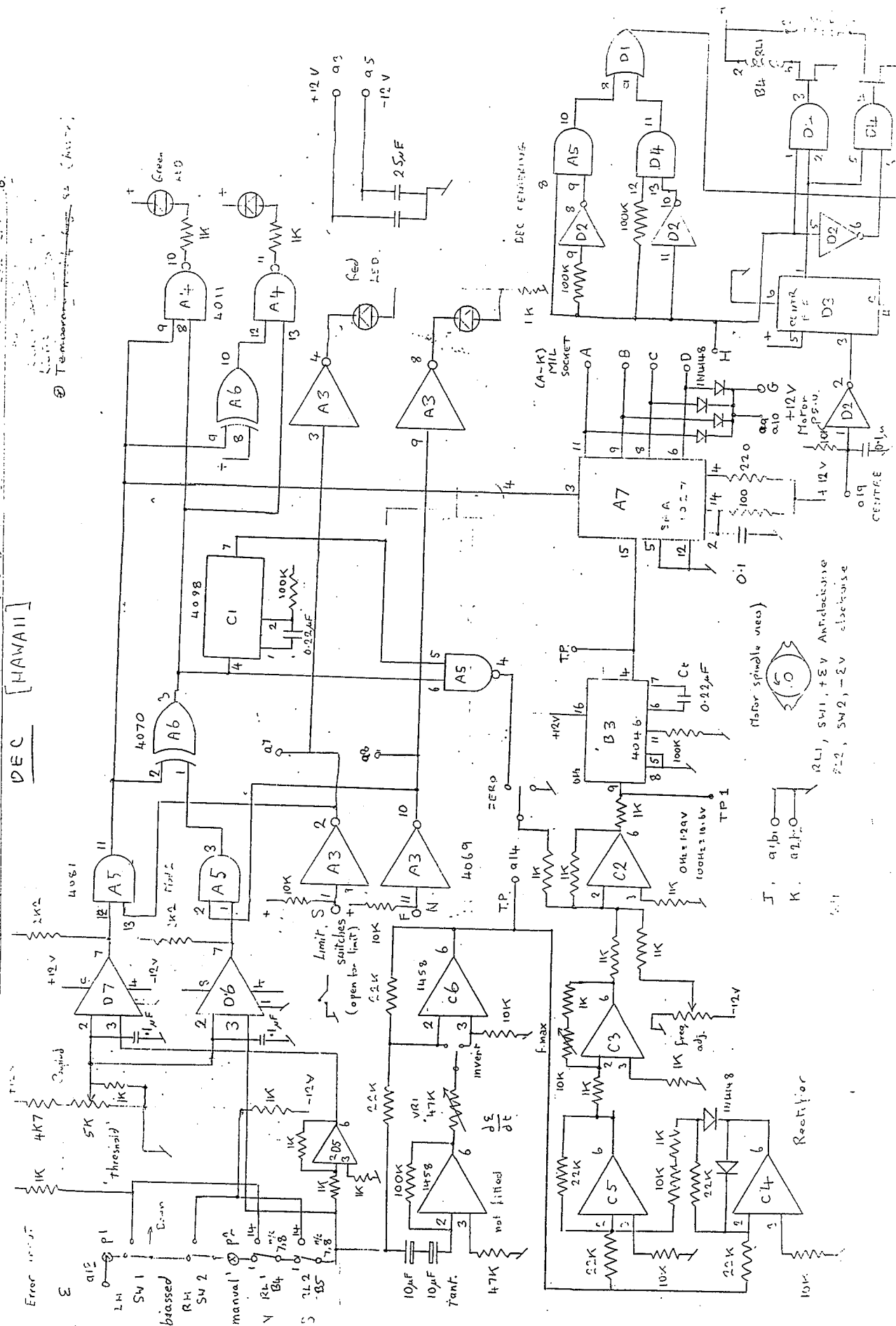


BATTERY BACKUP P.S.U.

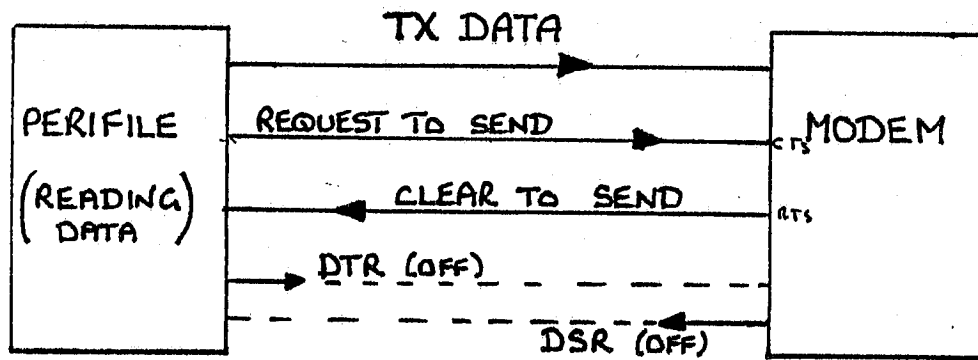
THIS WILL BE CHANGED FROM THE OLD SYSTEM.

A NEW SYSTEM WILL BE DEVELOPED AND SENT AS AN
ADD ON BOX TO BE FITTED ON THE BACK OF THE
CRATE

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RS 232C

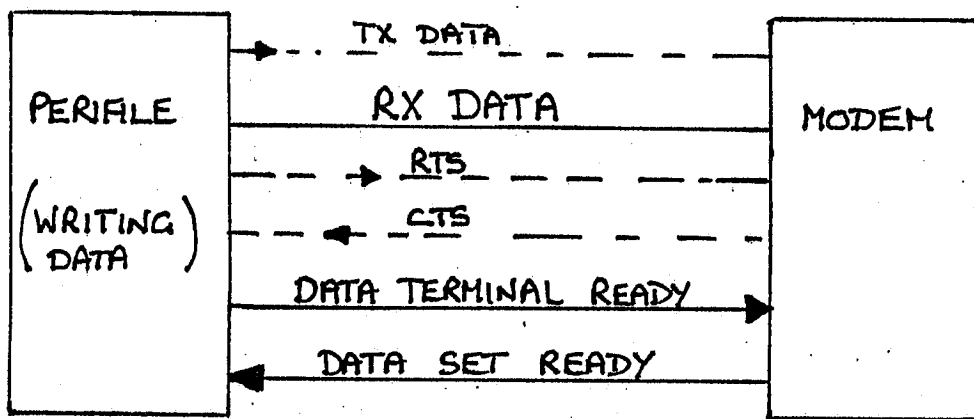


TERMINAL

DATA SET

WHEN DATA READY TO BE TRANSMITTED (IE BUFFER FULL)
 RTS GOES TRUE - ONLY IF CTS IS TRUE
 OR WHEN CTS GOES TRUE WILL TX DATA BE SENT.

* NOTE - DTR IS RAISED IF CONTROL CHARACTER OPTION IS SELECTED
 SO THAT XON XOFF MAY BE USED.



WHEN PERIFILE IS READY TO ACCEPT DATA
 FOR WRITING DTR WILL GO TRUE - USER
 SHOULD ENSURE DSR IS TRUE BEFORE
 SENDING DATA.

	5P IN O IN	LEAD	25Way D'		
	1	GREEN	7	GND	
CTS RTS	2	YELLOW	5, 6, 8	CTS, DSR,	2
DO RX	3	RED	2	TX	3
DI TX	4	BLACK	3	RX	4
MTS CTS	5	BLUE	4	RTS	5
	SCREEN		1		

CLOCK → TO SCALER → XTAL Control

C6 → +5V

C6

LGAT

C7 → +5V

C7

RGAT

C10

C10

C11

C11

C12

C12

C13

C13

C15

C15

C16 SEQOUT C9 SEQIN

C17 ENOH

C16 SEQOUT

C18

C18

C19

C19

C21

C21

C21

C27

C27

C22
C23

C22
C23

CLOCK → TO BBC.

a20

a20

a21

a21

a22

a22

a23

a23

a25

a25

a26

a26

a27

a27

SUPPLY

CLOCK

SCALER

BBC.

GND

a1, C1

a1, C1

a1, C1

GND

aec31, aec32 aec31, aec32 aec31, aec32

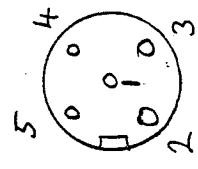
+5

aec29, aec30 aec29, aec30 aec29, aec30

+VBS

a28, C28

B.B.C. COMPUTER CABLE RS423 PORT → PER TX TAPE UNIT



RS423
PORT

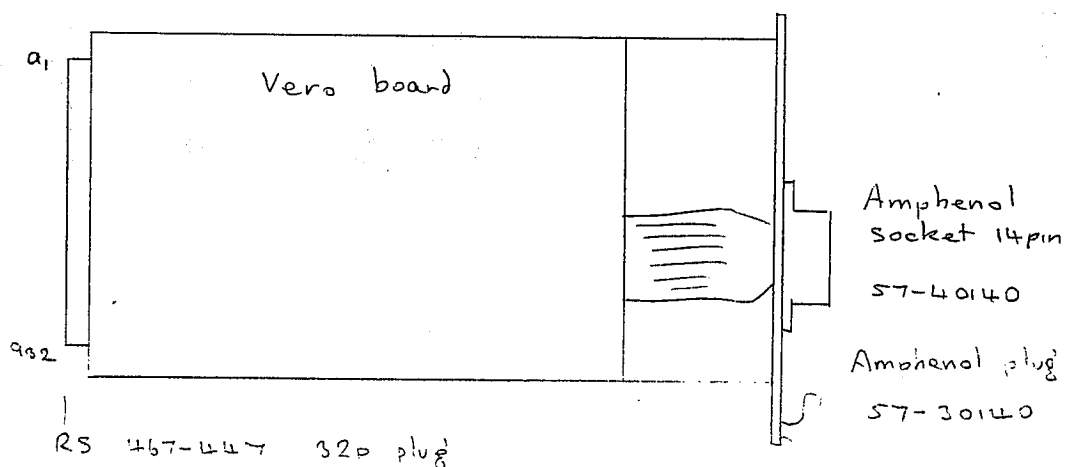
DIN PLUG		25 W.D. free sockets	
BBC	PEREX		
Ø V	1	7	SIGNAL GND GREEN
CTS	2	6, 20	DS R/DTR YELLOW
DATA OUT	3	3	RX DATA BLUE
DATA IN	4	2	TX DATA RED
RTS	5	5	CTS WHITE
	-	1	GND SCREEN

MU1A SCALER SYSTEM - BBC INTERFACE

A	B		C	
AMPHENOL (FRONT PLUG/SKT)	EURO BACK PLANE	FUNCTION	BBC PORT	
1	a1	GND	5,7-000-17	
2	a20	D0	6	
3	a21	D1	8	
4	a22	D2	10	
5	a23	D3	12	
6	a25	D7	20	
7	a31, a32	GND	5 - 17	
8	a10	D6	18	
9	-			
10	-			
11	a24	GND	5 - 17	
12	a26	CB1	2	
13	a27	CB2	4	
14	-			

COLUMNS A + B - INTERFACE BOARD

COLUMNS A + C - BBC CABLE



LUNAR

MU1A SCALER SYSTEM - BBC INTERFACE

A	B	C	
AMPHENOL (FRONT PLUG/SKT)	EURO BACK PLANE	FUNCTION	BBC PORT I.D.C.
1	a 1	GND	5,7-000-17
2	a 20	D0	6
3	a 21	D1	8
4	a 22	D2	10
5	a 23	D3	12
6	a 25	D7	20
7	a 31, a 32	GND	5 --- 17
8	a 10	D6	18
9	-	D4	14
10	-	D5	16
11	a 24	GND	5 --- 17
12	a 26	CB1	2
13	a 27	CB2	4
14	-		

COLUMNS A + B - INTERFACE BOARD

COLUMNS A + C - BBC CABLE

